South Umpqua River Watershed Harvest Plan Environmental Assessment

Bureau of Land Management
Roseburg District Office
South River Field Office
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Chapter One
Purpose and Need for Action

This chapter provides a description of the purpose and need for the proposed action analyzed in this environmental assessment (EA).

I. Proposed Action

The proposed action is the implementation of an integrated timber management plan located primarily in the Days Creek, Coffee Creek, St. Johns Creek, Shively O'Shea Creek, and Stouts Creek sixth-field subwatersheds of the South Umpqua River fifth-field watershed. Information and recommendations from the South Umpqua Watershed Analysis and Water Quality Restoration Plan (USDI, BLM 2001 (SUWA)) were considered in the development of the proposed action.

Approximately one acre of one proposed density management unit extends into the Middle Cow fifth-field watershed, and six acres of another into the Upper Cow fifth-field watershed. Owing to the ridge-top nature of these two units, the small acreage and percentage of land base affected, treatment of these acres is not expected to have any cumulative impact to hydrologic function or water quality, age class distribution, or habitat conditions in these adjoining watersheds.

The proposed action is threefold, consisting of:

- Regeneration harvest of an estimated 236 acres of mature and late-seral forest stands allocated to the General Forest Management Area in Section 25, T. 29 S., R. 3 W.; and Sections 3 and 4, T. 30 S., R. 4 W., W.M.;
- Commercial thinning and density management of an estimated 897 acres allocated to the Matrix (General Forest Management Area and Connectivity/Diversity Blocks), including density management in associated Riparian Reserves. The proposed units are in Sections 8, 17, 18, and 19, T. 29 S., R. 2 W.; Sections 13, 25, 27, 33, and 35, T. 29 S., R. 3 W.; Section 9, T. 30 S., R. 2 W.; and Sections 3, 7, 15, 21, and 23, T. 30 S., R. 3 W., W.M.; and
- Density management of an estimated 574 acres of mid-seral forest stands allocated to Late-Successional Reserves in Sections 29, 32 and 33, T. 30 S., R. 4 W.; Section 25, T. 31 S., R. 3 W.; Sections 4, 9, 13, 21, 23, and 30, T. 31 S., R. 4 W.; and Section 25, T. 31 S., R. 5 W., W.M.

It is estimated that the proposed regeneration harvest in the General Forest Management Area would yield approximately six million board feet of timber in support of the Roseburg District's declared annual allowable sale quantity (ASQ) of 45 million board feet.

Commercial thinning and density management in the General Forest Management Area and Connectivity/Diversity Blocks, and density management in Riparian Reserves and Late-Successional Reserves is expected to generate a range of between seven thousand and fifteen thousand board feet per acre. Using a median of ten thousand board feet per acre, these treatments would yield an estimated 15 million board feet of timber. Some additional miscellaneous volume would be derived from the construction of roads and helicopter landings.

Timber volume from commercial thinning and density management in the General Forest Management Area and Connectivity/Diversity Blocks would contribute toward ASQ objectives, whereas volume from density management in Riparian Reserves and Late-Successional Reserves would not.

II. Objectives

Timber management on the Revested Oregon and California Railroad Lands (O&C Lands) managed by the South River Field Office is principally authorized and guided by:

The Oregon and California Act of 1937: Section 1 of the O&C Act (43 USC § 1181a) which stipulates that O & C Lands be managed "… for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities…"

The Federal Land Policy and Management Act (FLPMA): Section 302 at 43 U.S.C. 1732(a), directs that "The Secretary shall manage the public lands . . .in accordance with the land use plans developed by him under section 202 of this Act when they are available . . ."

Roseburg District Record of Decision/Resource Management Plan (ROD/RMP): The ROD/RMP (USDI, BLM 1995a), approved in accordance with the requirements of FLPMA, provides specific direction for timber management.

The Roseburg District ROD/RMP (p. 60) directs that timber resources be managed to "Provide a sustainable supply of timber and other forest products".

The Roseburg District *Proposed Resource Management Plan/Environmental Impact Statement* (USDI, BLM 1994 (PRMP/EIS)) assessed the cumulative effects of the Roseburg District timber management program. Based on this analysis, the ROD/RMP (p. 8) anticipated 1,190 acres of regeneration harvest and 250[1] acres of commercial thinning/density management annually in support of the sustained yield assumptions for an annual ASQ of 45 million board feet of timber. The ASQ is predicated, in part, on the aforementioned and following assumptions.

A. *Regeneration Harvest*

Suitable timber lands in the General Forest Management Area are to be managed in a manner consistent with the principles of sustained yield. Once this decision was made, the primary unresolved issue is not if, but when and how timber harvest will occur. Regeneration harvest is to be scheduled in the General Forest Management Area to assure that over time, harvest occurs at or above the age of volume growth culmination (i.e., culmination of mean annual increment[2] (CMAI)). In the planning area the CMAI occurs between 80 and 110 years of age (ROD/RMP, p. 61).

[1] ROD/RMP errata corrected in the 2002 Roseburg District Annual Program Summary and Monitoring Report.

[2] Culmination of mean annual increment (CMAI) is defined as the age in the growth cycle of a tree or stand at which the mean annual increment for height, diameter, basal area, or volume is at a maximum. (The Dictionary of Forestry The Society of American Foresters 1998)

B. ***Commercial Thinning and Density Management in the Matrix***

Within the matrix, the ROD/RMP (p. 60) further directs that developing stands are to be managed to promote tree survival and growth to achieve a balance between wood volume production, quality of wood, and timber value at harvest by implementation of actions that include commercial thinning and density management designed to reduce competition among remaining trees. Specific to this direction:

- In the General Forest Management Area, commercial thinning would be programmed in stands under 80 years of age and would be designed to assure high levels of timber volume productivity (ROD/RMP, p. 151);
- In Connectivity/Diversity Blocks, commercial thinning would be undertaken in stands up to 120 years of age and usually designed to assure high levels of timber volume productivity (ROD/RMP, p. 153); and
- In Riparian Reserves, density management is to be applied to control stocking levels, establish and manage non-conifer vegetation, and acquire vegetation characteristics consistent with Aquatic Conservation Strategy objectives (ROD/RMP, pp. 153-154).

C. ***Density Management in Late-Successional Reserves***

The ROD/RMP (p. 29) also directs that silvicultural treatments be applied within Late-Successional Reserves that are beneficial to the creation of late-successional habitat. If needed to create or maintain late-successional forest conditions, thinning operations would be conducted in stands up to 80 years of age.

Further guidance is provided by the South Umpqua River/Galesville Late-Successional Reserve Assessment (USDA and USDI 1999 (LSRA)), as amended in 2004, covering portions of the project area located within Late-Successional Reserve #RO223. The LSRA recommends treatments, which are also summarized in watershed analysis (SUWA pp 94-95), and identifies priority locations for management actions to maintain habitat conditions and strengthen the connectivity function between the Coast Range Province and the Cascade Province (LSRA p. 6).

General objectives are to:

- Provide desired levels of coarse wood and snags (LSRA p. 50);
- Maintain and enhance connectivity across the landscape (LSRA pp. 51-52);
- Promote establishment of large blocks of late-successional habitat (LSRA p. 53); and
- Enhance habitat conditions around spotted owl activity centers (LSRA pp. 53-54).

III. Decision Factors

Factors to be considered will include:

- The degree to which the described objectives would be achieved, including: harvest prescription; the manner of harvest with respect to the types of equipment and yarding methods employed; seasons of operation; and the manner of access, including road renovation, and the type and location of any new road construction;

- The nature and intensity of environmental impacts that would result from implementation of the proposed action, and the nature and effectiveness of measures to minimize impacts to resources that may include, but would not necessarily be limited to wildlife and wildlife habitat, aquatic habitat, soil productivity, water quality, and air quality;
- Compliance with ROD/RMP management direction, terms of consultation on species listed and critical habitat designated under the Endangered Species Act; the Clean Water Act; Clean Air Act, Safe Drinking Water Act, O&C Act, and other BLM programs such as Special Status Species;
- The degree to which LSRA objectives would be met; and
- How to provide timber resources in support of local industry, and provide revenue to the Federal and County governments from the sale of those resources while reducing short-term and long-term costs of managing the lands in the project area.

IV. Conformance

This environmental assessment will consider and compare the environmental consequences of both the proposed action and no action alternatives. It will provide sufficient evidence for determining whether to prepare a finding of no significant impact or, if anticipated impacts would exceed those considered and adopted in the Roseburg District PRMP/EIS, preparation of a Supplemental Environmental Impact Statement (SEIS). In addition to the PRMP/EIS, this analysis tiers to assumptions and analysis of consequences provided by:

- The *Final Supplemental Environmental Impact Statement* (FSEIS) *on Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl* (USDA and USDI 1994a);

- The *Final Supplemental Environmental Impact Statement to the 2004 Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines* (USDA and USDI 2007).

In addition to statutory requirements, implementation of the proposed action would conform to the requirements of the ROD/RMP which incorporates as management direction the standards and guidelines of the *Record of Decision for Amendments* (ROD) *to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA and USDI 1994b), as amended by the *Record of Decision to Remove the Survey and Manage Mitigation Measure Standards and Guidelines from Bureau of Land management Resource Management Plans Within the Range of the Northern Spotted Owl* (USDI, BLM 2007a).

Chapter Two
Discussion of Alternatives

This chapter describes the basic features of the alternatives being analyzed in this environmental assessment.

I. Alternative One - No Action

Under this alternative, there would be no regeneration harvest in Section 25, T. 29 S., R. 3 W.; and Sections 3 and 4, T. 30 S., R. 4 W., W.M. This would not constitute a decision to reallocate these lands to non-commodity uses, however. Future harvest would not be precluded and could be analyzed under a subsequent EA.

Commercial thinning and density management would not occur in Matrix stands in Sections 8, 17, 18, and 19, T. 29 S., R. 2 W.; Sections 13, 25, 27, 33, and 35, T. 29 S., R. 3 W.; Section 9, T. 30 S., R. 2 W.; and Sections 3, 7, 15, 21, and 23, T. 30 S., R. 3 W., W.M. Density management would not occur in Late-Successional Reserve #RO223 in Sections 29, 32, and 33, T. 30 S., R. 4 W.; Section 25, T. 31 S., R. 3 W.; Sections 4, 9, 13, 21, 23, and 30, T. 31 S., R. 4 W.; and Section 25, T. 31 S., R. 5 W., W.M.

There would be no construction of roads or helicopter landings to provide access for yarding and hauling of timber. Road renovation and improvements for reasons such as realignment for user safety, or correction of drainage deficiencies to address erosion or water quality issues would not be undertaken, nor would the decommissioning of roads identified as surplus to long-term transportation and management needs. Road maintenance would be conducted on an as-needed basis to provide resource protection, accommodate reciprocal users, and protect government investment in the roads.

II. Alternative Two – The Proposed Action

As described in Chapter One, the proposed action consists of: regeneration harvest of an estimated 236 acres in the General Forest Management Area (GFMA); commercial thinning and density management of an estimated 897 acres allocated to the General Forest Management Area and Connectivity/Diversity Blocks (C/D Block) with density management in associated Riparian Reserves; and density management of an estimated 574 acres of mid-seral forest stands allocated to Late-Successional Reserve #RO223. Maps of the proposal are provided in *Appendix A*.

A. Timber Management Prescriptions

1. Regeneration Harvest

Table 2-1 provides a general description of the proposed regeneration harvest by: unit identifier; land use allocation; approximate acreage; anticipated yarding method; seasonal restrictions on harvest and hauling; and the anticipated manner of site preparation, post-harvest.

Table 2-1
Description of Proposed Regeneration Harvest

Unit ID	Land Use Allocation	Acres	Yarding Method	Seasonal Restrictions*	Proposed Site Preparation
29-3-25D	GFMA	14	Cable	1 and 4	Hand pile & Burn
29-3-25E	GFMA	27	Cable	1 and 4	Hand pile & Burn
29-3-25F	GFMA	27	Cable	1 and 4	Hand pile & Burn
29-3-25G	GFMA	19	Helicopter	1 and 4	Hand pile & Burn
30-4-3A	GFMA	75	Cable and Ground-based	2 and 4	Hand pile & Burn
30-4-3B	GFMA	25	Cable	1 and 4	Broadcast Burn
30-4-4A	GFMA	31	Cable	1, 2 and 4	Hand pile & Burn
30-4-4B	GFMA	18	Cable and Ground-based	2 and 4	Broadcast Burn

*See pages 13 and 14 for explanation

Riparian Reserves

Riparian Reserves would be established on all intermittent and perennial streams within or adjacent to proposed harvest units, with the widths based on the site potential tree height for the watershed. The site-potential tree height is calculated from the average site index of inventory plots throughout a watershed located on lands capable of supporting commercial timber stands. For the South Umpqua River fifth-field watershed, site-potential tree height is 160 feet (SUWA, p. 67).

On intermittent streams and perennial streams that are not fish-bearing, Riparian Reserve widths would be 160 feet wide slope distance, measured from the top of the stream bank. Riparian Reserves on intermittent and perennial streams that are fish-bearing would be 320 feet wide, slope distance, measured from the top of the stream bank.

To protect and maintain the integrity of the Riparian Reserves, timber would be directionally felled away from them and yarding would be prohibited within or through them. If trees in Riparian Reserves are needed for tailholds, use of straps, plates or cribbing would be required to protect the trees from any severe damage. If necessary to cut trees in Riparian Reserves, they would be left to supplement existing large woody debris and allow for potential in-stream recruitment.

Retention Trees, Snags and Large Woody Debris

An average of six to eight green conifers per acre would be retained in units in the General Forest Management Area (ROD/RMP p. 64). These figures represent a range of retention averaged over unit acres, and not an absolute minimum or absolute maximum number of trees that must be retained on each individual acre.

Retention trees would be selected to proportionally reflect the existing conifer species composition of the stands, and the range of diameter classes greater than 20 inches in diameter breast height.

Consideration would be given to selecting retention trees with deformed tops, bole cavities and other structural defects that would supplement existing snags and provide for wildlife species that utilize and depend on these habitat features. Over time as the trees age, decline and die they would provide snags and large down wood as long-term legacy components over the period between stand harvest and maturation of replacement stands.

Snags would be reserved where practical, from operational and safety perspectives, to meet the analytical assumption of the PRMP/EIS (p. 4-43) to provide an average of 1.2 snags per acre, and management direction from the ROD/RMP (pp. 34-35) to provide snags sufficient to support cavity nesting birds at 40 percent of potential population levels. If snags cannot be left because of operational or safety reasons additional green retention trees would be designated for future snag recruitment.

In addition to reservation of all existing Decay Class 3, 4 and 5 large down wood under contract provisions, a minimum of 16 inches in diameter and 16 feet in length, an average of 120 lineal feet per acre of Decay Class 1 and 2 large down wood would be provided (ROD/RMP, p. 65).

Site Preparation and Reforestation

Where proposed, broadcast burning would be accomplished in the spring when moderate temperatures and high moisture content in soils, duff and large woody debris would minimize fire intensity and duration. This would limit loss of or damage to snags and retention trees. It would also limit consumption of duff, surface litter and large woody debris, and minimize the scope and duration of impacts to air quality (ROD/RMP, p. 77).

Prescribed burning within one-quarter mile of known owl activity centers would be prohibited between March 1st and July 15th unless sites are determined to be unoccupied.

In the Wildland Urban Interface, where site preparation and/or hazardous fuels reduction is needed but broadcast burning is not appropriate, hand piling would be used. Slash would be piled and covered at completion of harvest and burned the following fall or winter during periods of rain, and when soil and duff moisture content is high. This would minimize consumption of duff and litter, reduce the likelihood of fire burning across entire units, and minimize impacts to air quality.

Harvested units would be planted within a year of completion of site preparation with a mixture of Douglas-fir and other conifers such as ponderosa pine, sugar pine and incense-cedar grown from seed collected from trees adapted to local climate and growing conditions. At lower elevations seedlings would be mulched to retain soil moisture and reduce competition from grasses.

2. Commercial Thinning and Density Management in the Matrix

Table 2-2 provides a general description of the proposed commercial thinning and density management in the Matrix by: unit identifier; land use allocation; approximate acreage; anticipated yarding method; and seasonal restrictions on harvest and hauling.

Table 2-2
Description of Proposed Commercial Thinning and Density Management in the Matrix

Unit ID	Land Use Allocation	Acres	Yarding Method	Seasonal Restrictions*
29-2-08A	GFMA	44	Cable	1, 3 and 5
29-2-17A	C/D Block	33	Cable	1, 3 and 5
29-2-18A	GFMA and C/D Block	62	Cable and Ground-based	1, 2, 3 and 5
29-2-19A	GFMA	16	Cable and Ground-based	1, 2, 3 and 5
29-3-13A	GFMA	13	Cable	2, 3 and 5
29-3-25A	GFMA	30	Cable	1, 3, and 5
29-3-25B	GFMA	17	Helicopter	1, 3, and 5
29-3-25C	GFMA	6	Helicopter	1, 3, and 5
29-3-27A	C/D Block	60	Ground-based and Helicopter	2, 3, and 5
29-3-27B	C/D Block	201	Cable and Helicopter	1, 3, and 5
29-3-27C	C/D Block	13	Helicopter	1, 3, and 5
29-3-33A	GFMA	5	Dropped from analysis because of low stand density and timber volume.	
29-3-35A	GFMA	51	Cable and Ground-based	1, 2, 3, and 5
29-3-35B	GFMA	26	Cable	1, 3, and 5
30-2-09A	GFMA	29	Cable	2, 3, and 5
30-2-09B	GFMA	30	Cable and Ground-based	2, 3, and 5
30-3-03A	GFMA	10	Dropped from analysis because of low stand volume. Will be reevaluated in ten years.	
30-3-07A	GFMA	7	Stand dropped as it is dominated by hardwoods with insufficient conifer volume for a commercial thinning.	
30-3-07B	GFMA	14	Stand age and canopy layer differentiation make stand inappropriate for thinning.	
30-3-15A	GFMA	138	Cable, Ground-based and Helicopter	1, 2, 3, and 5
30-3-15B	GFMA	30	Cable and Helicopter	1, 3, and 5
30-3-21A	GFMA	9	Cable	1, 3, and 5
30-3-21B	GFMA	3	Cable	1, 3, and 5
30-3-21C	GFMA	24	Helicopter	1, 3, and 5
30-3-23A	GFMA	26	Cable and Ground-based	2, 3, and 5

*See pages 13 and 14 for explanation

Marking Prescription

Thinning would be designed to increase tree size through time, extend the age at which CMAI (defined on page 2) is reached, and capture timber volume that would otherwise be lost to anticipated suppression mortality. Stands would be principally thinned from below by removing trees from the suppressed and intermediate canopy classes, although some co-dominant and dominant trees could be cut to achieve desired stand densities.

The healthiest, best-formed trees would be favored for retention and generally have at least a 30 percent live crown ratio so that crown expansion and accelerated diameter growth would be more likely following thinning (Daniel, et. al. 1979).

Larger, older remnant trees predating the present stands are present in most units, but are not the focus of commercial thinning and would be retained to the greatest degree practicable. Circumstances where these trees could be cut would be limited to clearing of road rights-of-way and landing areas, and resolving safety concerns subject to Oregon laws and regulations.

Stands in the General Forest Management Area would be thinned to a relative density index[3], on average, of approximately 0.35 to maximize stand volume growth. Approximately 35 percent of stand basal area would be removed while retaining approximately 100 trees per acre. Canopy closure would be reduced by approximately one-third.

In Connectivity/Diversity Block units, density management would reduce the relative density index to approximately 0.25 to 0.30, using a variable density prescription based on a combination of basal area and trees per acre to encourage development of structural diversity. Between 60 and 90 trees per acre would be retained and up to 45 percent of stand basal area removed. Canopy closure would be reduced approximately ten percent more than the lighter thinning applied in the General Forest Management Area. Large hardwood trees would be retained, as available, to contribute toward the future objective of providing an average of two per acre for retention at regeneration harvest. The stands would also be evaluated for under-planting with indigenous conifers such as Douglas-fir, incense-cedar, sugar pine and ponderosa pine to help create a secondary canopy layer.

Where present, hard conifer and hardwood snags at least16 inches in diameter breast height and 20 feet tall would be would be retained to the extent practical. Where operationally feasible and not in conflict with density objectives, snags would be protected by a ring of rub trees to prevent disturbance during yarding.

Riparian Reserves

Riparian Reserves, as described on page 6, would be established on all streams within or adjacent to proposed commercial thinning units. Variable-width "no-harvest" buffers would be delineated within the Riparian Reserves to protect stream bank integrity, maintain streamside shade, and provide a vegetated filtering strip to intercept overland run-off and precipitate any water-borne sediments before they reach streams. To prevent soil disturbance and displacement that could result in sedimentation, no ground-based operations would be allowed within the "no-harvest" buffers.

[3] Relative density index compares current stand density with the theoretical maximum density. In general terms, for a given average diameter, a stand can support a maximum number of trees per acre. Conversely, for a given number of trees per acre, there is a maximum average diameter possible.

"No-harvest" buffers would be a minimum slope distance of 20 feet in width on intermittent and perennial streams that are non-fish-bearing, and a minimum of 50 feet on all fish-bearing streams. Other considerations would include: streamside habitat features such as snags or large woody debris accumulations; topography; riparian vegetation; aspect and susceptibility to solar heating; and proximity to critical habitat for coho salmon and Essential Fish Habitat. Trees would be felled away from the "no-harvest" buffers to maintain their integrity. If necessary to fell trees in the "no harvest" buffers, they would be left to provide in-stream wood and stream bank protection.

A variable density prescription, similar to that used in Connectivity/Diversity Block units, would be designed to accelerate individual tree growth, allow understory development, and hasten development of late-seral conditions. Tree selection would not be based solely on form and could include trees with broken or deformed tops. Hardwoods and less common conifers would receive preferential consideration for retention. Snags would be retained where feasible, and protected by marking a ring of rub trees or buffering them with untreated areas. Snags felled for operational and safety reasons would be retained on site for potential recruitment into streams.

Hazardous Fuels Reduction

Slash at landings would be burned to reduce roadside fuel concentrations. In the Wildland Urban Interface, a post-thinning evaluation would be used to determine if hand-piling or pull back is necessary adjacent to roads and property lines.

3. Density Management in the Late-Successional Reserves

Table 2-5 provides a general description of the proposed LSR density management units by: unit identifier; approximate acreage; anticipated yarding method; and seasonal restrictions on harvest and hauling.

Table 2-3 Description of Proposed Density Management in the LSR

Unit ID	Treated Acres	Untreated Acres	Yarding Method	Seasonal Restrictions *
30-4-29A	Low tree density and insufficient volume to support a commercial treatment.			
30-4-29B	21	~6	Cable	1, 3, and 5
30-4-32A	Dropped because unit currently meets wildlife objectives for structural diversity.			
30-4-33A	91	~47	Cable and Ground-based	2, 3, and 5
31-3-25A	43	~5	Cable and Ground-based	2, 3, and 5
31-4-09A	63	~10	Cable and Ground-based	2, 3, and 5
31-4-13A	30	~5	Cable	1, 3, and 5
31-4-13B	18	~7	Cable	1, 3, and 5
31-4-21A	12	~2	Cable	1, 3, and 5
31-4-21B	Low tree density and insufficient volume to support a commercial treatment.			
31-4-23A	29	~8	Cable	2, 3, and 5
31-4-23B	25	~3	Cable	1, 3, and 5
31-4-30A	Tree size is too small to warrant a commercial treatment.			
31-5-25A	20	~3	Cable	2, 3, and 5

*See pages 13 and 14 for explanation

Marking Prescription

Density management treatments would be designed to mimic natural disturbances that reduce stand density, using direction from the *South Umpqua River/Galesville LSRA* (pp. 75-77), as amended in 2004, to move stand development toward desired late-successional conditions described in the LSRA (pp. 48-63).

Thinning would generally remove trees from the suppressed and intermediate canopy classes, reserving trees 20 inches diameter breast height and larger. Proportional thinning across diameter classes could occur, though, if needed to achieve desired stand density and diameter distribution. Trees greater than 20 inches diameter breast height that are cut would be retained on site for coarse wood.

Two types of variable spacing thinning treatments would be applied. Light thinning, comparable to thinning in the General Forest Management Area, would generally retain between 90 and 100 trees per acre, while moderate thinning, comparable to the prescription for Connectivity/Diversity Block units would retain 60 to 80 trees per acre. Basal area retention and post-treatment canopy closure levels would also be comparable in nature.

Because of present stand conditions and previous density management entries in the Slimewater and Shively Creek drainages that abut some proposed density management units, no heavy thinning or gap creation is proposed.

Approximately 20 percent of the Late-Successional Reserve acres proposed for treatment would be retained as unthinned patches to maintain stand processes and conditions in their present state.

As in the Matrix allocations, conifer trees selected for retention would generally have at least a 30 percent live crown ratio so that live crown expansion and accelerated diameter growth would be more likely following thinning. Selection would not be restricted to the healthiest and best formed trees, however, and would include deformed and broken top trees. Douglas-fir would be the dominant overstory species, with other conifer species retained, where available, in numbers that reflect the species mix of the respective vegetation zones.

Hardwoods selected for retention would generally be greater than 10 inches diameter breast height and reasonably likely to survive density management operations.

As in the Matrix, large, older remnant trees would not be the focus of density management and would be retained to the greatest degree practicable. Cutting of any remnant trees would be subject to the same limitations previously described. Snags would be retained and protected to the greatest extent practical by enclosing them in unthinned areas, or protecting them with a ring of rub trees. Snags felled for operational or safety reasons would be left on site to supplement coarse wood.

Riparian Management Areas

Riparian management areas, comparable to Riparian Reserves described in the discussion of commercial thinning and density management in the Matrix, would be established on all streams in or adjacent to LSR density management units. "No-harvest" buffers would also be established in consideration of the same factors and subject to the same operational considerations discussed on page 10.

Course Wood and Snag Objectives

It is anticipated that coarse woody debris objectives would be adequately provided for in the following ways:

- Contract provisions would reserve existing Decay Class 3, 4, and 5 large woody debris at least 16 inches in diameter and 16 feet in length;
- Snags felled for safety or operational reasons would be retained on site;
- Non-merchantable materials generated during density management operations, including broken-out tree tops would largely be left in place; and
- Natural events such as windthrow, wind break, snow break, and suppression mortality would provide additional coarse woody debris.

Snag objectives would be met through:

- Reservation and protection of snags where operationally viable and consistent with the density management prescriptions;
- Operational damage leading to broken tops or individual tree mortality; and
- Weather damage such as wind and snow break.

The potential need for additional trees to meet snag and coarse wood needs would be factored into the marking prescriptions. Surveys would be conducted the first and third years following completion of density management in order to monitor levels of coarse wood and numbers of snags. In the event that deficits in snags and/or coarse wood still exist five years after density management treatments are completed, additional trees reserved under the marking prescription would be felled or girdled to meet coarse wood and/or snag objectives.

Hazardous Fuels Reduction

Slash piles at landings would be burned to reduce roadside fuel concentrations. As would be done in the Wildland Urban Interface, post-thinning fuel load would be evaluated in the LSR to determine whether hand-piling and burning, or pull back of fuels is necessary adjacent to roads and property lines.

B. Yarding

For ground-based operations, the following project design features would apply:

- Limited to slopes of 35 percent or less, on pre-designated trails, using existing trails to the greatest degree practicable;
- Ground-based harvest in commercial thinning and density management units would be conducted with harvester/forwarder equipment;
- In regeneration harvest units, compacted skid trails would be sub-soiled upon completion of harvest and site preparation; and
- In commercial thinning and density management units, landings on temporary roads would be subsoiled in conjunction with decommissioning of the roads.

For cable yarding operations the following project design features would apply:

- Skyline systems capable of maintaining a minimum one-end log suspension would be utilized. If necessary, other contract requirements may be specified such as the type of logging carriage to be used to achieve this end;
- Cable yarding equipment used in commercial thinning and density management operations would have a minimum of 100 feet of lateral yarding capacity, and yarding corridors would be pre-designated.
- Landings would be located at least 200 feet apart to the extent practicable.

Cable yarding typically requires the use of trees located outside of unit boundaries for tailholds and guyline anchors. Tailhold trees seldom require cutting, and contract provisions require that purchasers obtain written approval before attaching logging equipment to any tree in the timber reserve, and take appropriate measures to protect the tree from undue damage. Protection measures could include the use of tree plates, straps or cribbing. Guyline trees are subject to state safety regulations as they are located in the guyline radius of cable yarding equipment. As a general rule, they are always cut.

Helicopter yarding would be accomplished with a ship capable of fully suspending logs above the ground and surrounding treetops. Landings would be at: the end of the proposed extension to Road No. 30-3-15.1 in Unit 30-3-15A; a quarry on Road No. 29-3-33.0 below Unit 29-3-27B; and at the junction of Road Nos. 29-3-27.0, 29-3-25.0 and 29-3-25.1 above Unit 29-3-25A.

C. Seasonal Operational Restrictions for Timber Harvest and Hauling

1) Operations are allowed throughout the year subject to any other seasonal restrictions that follow.
2) Ground-based operations or cable yarding to roads not suitable for all-weather hauling would be restricted to the period of May 15th to October 15th. Season of operations may be extended, subject to a provisional waiver, if weather conditions and soil moisture content warrant.
3) For commercial thinning and density management, felling and yarding of timber other than that associated with the clearing of road rights-of-way would generally be prohibited during the bark-slip period, from April 15th to July 15th.

4) Removal of suitable nesting, roosting and foraging habitat within one-quarter mile of known **northern spotted owl** (*Strix occidentalis caurina*) activity centers, nest sites or unsurveyed suitable habitat, including habitat within timber sale units, would be prohibited from March 1st to September 30th. This restriction could be waived earlier if surveys determine owls are not present, have not nested, or have failed in nesting attempts. The waiver would be valid until March 1 of the following year. If two years of protocol surveys do not detect owl presence or activity, seasonal restrictions may be waived the following two years (USDI, USFWS 1992 p. 2).
5) Operations within applicable disruption threshold distances of known **northern spotted owl** nest sites, known owl activity centers, or unsurveyed suitable spotted owl habitat would be seasonally restricted from March 1st to July 15th. This restriction could be waived until March 1st of the following year if surveys indicate that spotted owls are not present, not nesting, or have failed in a nesting attempt.

D. Access

Primary access would be provided by roads under BLM control and/or private roads over which the BLM has rights under reciprocal agreements. Approximately 1.57 miles of road are proposed for renovation, of which 0.41 miles would be decommissioned after use. Additional access needs would be provided by construction of: three helicopter landings; approximately 0.73 miles of surfaced permanent roads, a surfaced temporary spur 0.34 miles in length and 14 unsurfaced temporary spurs approximately 2.55 miles in total length.

New roads would be located outside of Riparian Reserves on ridge top or stable side slope locations, wherever practicable. Where road gradients are less than six or seven percent, roads would be out-sloped for drainage in lieu of ditches and cross drains. For road gradients exceeding seven percent, road surfaces would be crowned and culverts installed at short intervals to quickly and evenly disperse run-off to the forest floor.

The intent is to construct, use and decommission unsurfaced temporary roads in the same operating season. If not possible because of events such as extended fire closure, the roads would be winterized prior to the onset of autumn rains for use the following year. The single surfaced temporary road would be decommissioned upon completion of harvest. In both instances, decommissioning may include one or more of the following: sub-soiling and/or blocking the road bed to vehicular traffic; constructing water bars or dips to drain road surfaces; removing culverts; and/ revegetating road beds.

Tables 2-4, 2-5 and 2-6 provide a breakout of the type and mileage of road construction by harvest unit, and the post-harvest disposition of the roads. Units already having suitable access are not listed in the Tables.

Table 2-4 Proposed Road Construction and Renovation for Regeneration Harvest

Unit ID	Proposed Road Construction and/or Renovation	Road Length (miles)	Disposition Post-Harvest
29-3-25D	Two (2) permanent surfaced spurs	0.06	Retain
29-3-25F	One (1) permanent surfaced spur	0.05	Retain
30-4-3A	Two (2)temporary unsurfaced spurs	0.31	Decommission
30-4-4A	One (1) permanent surfaced spur	0.18	Retain
	Two (2) temporary unsurfaced spurs	030	Decommission
30-4-4B	Two (2) temporary unsurfaced spurs	0.10	Decommission

Table 2-5 Proposed Road Construction and Renovation for Commercial Thinning and Density Management in the Matrix

Unit ID	Proposed Road Construction and/or Renovation	Road Length (miles)	Disposition Post-Harvest
29-3-13A	One (1) temporary unsurfaced spur	0.41	Water bar
29-3-27B	One (1) permanent surfaced spur	0.44	Retain
29-3-35A	Renovate unsurfaced spur	0.27	Decommission
29-3-35B	One (1) temporary unsurfaced spur	0.26	Decommission
30-2-09A	Renovate portion of Road No. 30-2-9.2	0.38	Retain
30-2-09B	Two (2) temporary unsurfaced spurs	0.25	Decommission
30-3-15A	One (1) temporary surfaced spur	0.34	Decommission/Block
30-3-23A	One (1) temporary unsurfaced spur	0.18	Decommission

Table 2-6
Proposed Road Construction and Renovation for Density Management in the LSR

Unit ID	Proposed Road Construction and/or Renovation	Road Length (miles)	Disposition Post-Harvest
30-4-33A	Renovate portion of unnumbered road.	0.57	Retain
31-5-25A	One (1) temporary unsurfaced spur	0.27	Decommission
31-4-09A	One (1) temporary unsurfaced spur	0.47	Decommission
31-4-23A	Renovate portion of unnumbered road	0.31	Retain
31-5-25A	Renovate portion of unnumbered road	0.14	Decommission
31-5-25A	One (1) temporary unsurfaced spur	0.10	Decommission

All of the proposed timber management units are in portions of the South Umpqua River fifth-field watershed designated as a Tier 1 Key Watershed. The ROD/RMP (p. 20) directs that existing road mileage in Key Watersheds is to be reduced. If this is not practical though, at a minimum, there should be no net increase in road mileage.

Since implementation of the ROD/RMP in 1995, the BLM and parties to reciprocal rights-of-way agreements have constructed 2.9 miles of permanent road. Over the same period of time, this has been offset by closure or full decommissioning of 7.7 miles of existing road, as reported in the 2006 Roseburg District Annual Program Summary and Monitoring Report (USDI, BLM 2007b).

Through field reconnaissance, and review of recommendations from watershed analysis, the BLM has identified approximately 2.3 miles of road, described in Table 2-7, for potential decommissioning. This work would be done under authorizations separate from the proposed timber sales, subject to agreement of parties holding access rights over the roads.

Table 2-7 Roads Proposed for Decommissioning:

Road Number	Miles	Road Location
30-4-22.0, Segment K	0.67	Section 13, T. 31 S., R. 4 W.
30-4-35.0, Segment A	0.10	Section 35, T. 30 S., R. 4 W.
31-4-2.0, Segment A	0.28	Section 35, T. 30 S., R. 4 W.
31-4-3.2, Segment A	0.48	Section 3, T. 31 S., R. 4 W.
31-4-3.3, Segment A	0.17	Section 3, T. 31 S., R. 4 W.
31-4-13.1, Segment A	0.18	Section 13, T. 31 S., R. 4 W.
31.4-13.3, Segment A	0.28	Section 13, T. 31 S., R. 4 W.
31-4-13.4, Segment A	0.11	Section 13, T. 31 S., R. 4 W.

Road No. 30-4-22.0, Segment K is located immediately adjacent to East Fork Shively Creek and is no longer passable because of multiple washouts at tributary junctions and the East Fork Shively Creek stream crossing. A failing log culvert at the junction with the 31-4-13.0 road would be removed, as would a 12 inch cross-drain located approximately 1000 ft from the junction with the 31-4-13.0 road. In general, this portion of the road is hydrologically stable and reconstruction of the road within the riparian area would have detrimental effects to downstream water quality.

E. Noxious Weeds and Invasive Non-Native Plants

Preventative measures would be implemented in conjunction with the proposed timber sales that focus on minimizing or eliminating the risk of introducing new weed infestations or spreading existing ones. These measures would include:

- Steam cleaning or pressure washing heavy equipment used in logging and road construction to remove soils and other materials that could transport weed seed or root fragments;
- Scheduling work in uninfested areas prior to work in infested areas; and
- Seeding and mulching disturbed areas with native seed; or revegetating with native plant species where natural regeneration is unlikely to prevent weed establishment.

III. Alternatives Proposed in Scoping But Not Analyzed in Detail

Limit timber management to commercial thinning and density management.

Commercial thinning and density management of mid-seral stands in lieu of any regeneration harvest of older forest stands in the watershed was considered but not analyzed in detail because it would be inconsistent with the sustained yield assumptions of the ROD/RMP and would not meet the objective of implementing an integrated timber management plan for the watershed toward achievement of the declared Roseburg District ASQ of 45 million board feet of timber.

The assumption of sustainability is predicated on the anticipated accomplishment of certain silvicultural practices at various levels on the Matrix lands (ROD/RMP, p. 60). These include an annual average regeneration harvest of 1,190 acres (ROD/RMP, p. 8), in conjunction with 250 acres of commercial thinning and density management in the Matrix.

If these practices are not implemented at the approximate levels anticipated in the ROD/RMP, the declared ASQ of 45 million board feet is not sustainable. Restricting timber management solely to the practice of thinning would be inconsistent with management direction from the ROD/RMP for sustainable timber harvest.

The EA should analyze the effects of harvest proposed in Section 25, T. 29 S., R. 3 W. on the roadless values of the 3000+ acre Coffee Creek unroaded area, and drop these units from proposed harvest.

BLM-managed lands were previously evaluated for wilderness characteristics and potential designation as wilderness study areas, comparable to the Forest Service evaluation and designation of lands as "roadless" areas. No wilderness characteristics were identified in the Coffee Creek drainage warranting it's designation as a wilderness study area. The BLM authority for conducting such reviews and establishing wilderness study areas expired on October 21, 1993 pursuant to Section 603 of the Federal Land Policy and Management Act. However, the BLM retained authority to inventory wilderness characteristics and to consider such information during land use planning. The area was reevaluated in 2006, and it was determined that there were no wilderness characteristics present. Other uses were emphasized as a priority. Consequently, this is not a subject open to review or requiring further analysis in this environmental assessment.

IV. Resources Not Present or Unaffected by the Alternatives

The following resources would not be affected by either of the alternatives, because they are absent from the immediate areas in which timber management activities are proposed: Areas of Critical Environmental Concern; prime or unique farmlands; floodplains; wilderness; waste, solid or hazardous; and Wild and Scenic Rivers.

The proposed action would be consistent with Executive Order 12898 which addresses Environmental Justice in minority and low-income populations. The BLM has not identified any potential impacts to low-income or minority populations, either internally or through the public involvement process, arising from this type of activity. Employment associated with the sales would involve local contractors who engage in similar types of work throughout Douglas County.

No Native American religious concerns have been identified by the South River Field Office through correspondence with local tribal governments.

As discussed on the preceding page and in the Chapter Three (p. 39), no measurable increase or decrease in the introduction or rate of spread of Noxious Weeds and Invasive Non-Native Plants is anticipated. Actions taken independently of the timber sales and under separate authorization will be implemented to contain, control and eradicate existing infestations regardless of whether or not decisions are made to implement the timber management proposed in this EA. Measures implemented through the timber sale contracts, discussed on page 16, would focus on preventing the introduction and establishment of new infestations.

No commercially usable energy sources are known to exist in the proposed timber sale areas. There are no other energy transmission, transport facilities and/or rights-of-way in the immediate vicinity of any of the proposed timber management units. Williams Pipeline Group has proposed construction of a Natural Gas Delivery Pipeline, however, that would cross portions of the South Umpqua River fifth-field watershed.

The preferred pipeline route would follow BLM Road No. 30-3-28.0 along the northeastern edge of proposed commercial thinning Unit 30-3-21A before turning east, crossing private lands in Section 22 of T. 30 S., R. 3 W. The route turns to the south on a ridgeline along the western edge of proposed commercial thinning Unit 30-3-23A. Approximately seven miles further to the south and east, the route also skirts the eastern edge of proposed density management Unit 31-3-25A. No aspects of the thinning and density management are anticipated to pose an impediment to pipeline construction, should the proposal be approved. Consequently, no adverse effect on energy resources would be expected.

Chapter Three
The Affected Environment

This chapter summarizes current conditions of specific resources present or potentially present in the project areas that could be affected by the proposed timber harvest.

I. Timber Resources

At the Fifth-Field Watershed Scale

The South Umpqua River fifth-field watershed drains approximately 141,455 acres or roughly 221 square miles. Factors that shaped present forest age-class distribution in the watershed include: clearing and conversion of forest land to agricultural, residential and municipal uses, damage and mortality from insect attack; stand-replacing wildfires; wind throw events; timber salvage; and regeneration harvest of mature and old-growth timber.

In 1900, approximately 61,800 acres was non-forested (SUWA, p.24). Approximately 69,945 acres were mid-seral and late-seral forest of merchantable value, ranging in volume from 5-50 thousand board feet per acre. The large amount of non-forest land was likely attributable to wildfires and clearing for agricultural uses. By 1936, an estimated 87 percent of the watershed was commercial forest (SUWA, p. 29, Table 36), roughly equivalent to what exists today.

In 2000, the condition of private lands was assessed. Of the approximate 62,623 acres of forest land under private ownership and management, 13 percent was early-seral forest less than 30 years old, 57 percent was mid-seral forest between 30 and 80 years old, and the remaining three percent was late-seral forest greater than 80 years of age (SUWA, pp. 71-73). Remaining lands not in Federal ownership and not forested (~18,000 acres) are primarily dedicated to residential properties and small farms, communities, roads and other infrastructure. It is not anticipated these uses will change appreciably in the foreseeable future.

Lands under BLM Management

The South River Field Office, Roseburg District, BLM manages 57,979 acres or roughly 41 percent of all lands in the watershed. Excluding 793 acres of non-forest land, the age class distribution on BLM-managed lands in 2000 (SUWA, p. 38) was approximately: 14,725 acres of early-seral forest representing approximately 26 percent of BLM-managed forest lands and 58 percent of all early-seral forest in the watershed. Mid-seral forest lands totaled 9,152 acres of mid-seral forest representing 16 percent of BLM-managed forest lands and 16 percent of all mid-seral forest in the watershed. There were 33,309 acres of late-seral forest lands in all land use allocations representing 58 percent of BLM-managed forest lands and 86.5 percent of all late-seral forest in the watershed. Approximately 19,893 acres of the 33,309 acres of late-seral forest under BLM management are typed as older than 200 years.

Vegetation Zones

Five vegetation zones are present in the watershed, as characterized in a Natural Resources Conservation Service soil survey (Hickman 1994). Each zone exhibits a single characteristic set of dominant plant communities that are related to local landscape features such as aspect, soil types and landform (SUWA, pp. 52-56). Vegetation zones are an approximate guide to complex local vegetation patterns, natural plant succession, and stand development processes.

- The **Interior Valleys and Foothills Zone** occupies the lower valleys and elevations, comprising about 20 percent of the watershed, including most of the agricultural lands noted above. Douglas-fir is the dominant conifer species on the most favorable sites with lesser numbers of ponderosa pine and incense-cedar. Hardwood associates include Pacific madrone, bigleaf maple, California black oak and occasionally Oregon white oak.
- The **Grand Fir Zone** transitions from the drier valleys to the moist hemlock forests at the upper elevations, comprising 37 percent of the watershed. Douglas-fir is dominant in older stands, with grand fir common on northern aspects but scarce or absent on southern aspects. Incense-cedar is common and western redcedar may be found in moister areas. Golden chinkapin is common on northern aspects and may be found in association with Pacific madrone and occasionally California black oak on drier southern aspects. Bigleaf maple and red alder are typically limited to moister sites.
- The **Douglas-fir/Chinkapin Zone** represents approximately 15 percent of the watershed. Except on shallow, rocky and droughty soils where Oregon white oak, canyon live oak and other shrubs are the primary occupants, Douglas-fir is the dominant species. Other conifer associates may include sugar pine, ponderosa pine and incense-cedar. Pacific madrone and California black oak are the notable hardwood associates.
- The **Western Hemlock Zone** occupies approximately 23 percent of the watershed at the higher elevations in the eastern and southeastern portions of the watershed. Western hemlock is the dominant understory and overstory species on northern aspects but is scarce on southern aspects. Primary associates are grand fir, western redcedar and golden chinkapin. On moister sites, bigleaf maple and red alder may be found.
- The **Cool Douglas-fir/Western Hemlock Zone** comprises about five percent of the watershed, above 3,000 feet, in the northeast corner and southernmost edges of the watershed. Douglas-fir is the dominant species with western hemlock found in areas that remain moist throughout most of the year. White fir, sugar pine, incense-cedar, and western redcedar occur sporadically. Precipitation is the highest with the major portion coming in the form of snow.

Species and Stand Composition within the Proposed Timber Management Units

Regeneration Harvest Units

Proposed harvest units in Section 25, T. 29 S., R. 3 W. are at elevations of 2,400 to 3,200 feet and roughly split between the Western Hemlock and Grand Fir vegetation zones. Forest Operational Inventory indicates the age of the stands to be principally between 190 and 220 years of age, excepting the eastern two-thirds of Unit 29-3-25F which is approximately 120 years old.

In 1987, the timber cruise for a sale in this same section indicated a species composition of approximately 96 percent Douglas-fir, with slightly over three percent incense-cedar. Western hemlock and sugar pine combined represented less than one percent of the stands. Because of the adjacency of the proposed harvest units to this previous sale, a comparable species composition is expected.

Proposed harvest units in Sections 3 and 4, T. 30 S., R. 4 W. are at elevations of 1,200 to 1,700 feet, in a transitional area from the Interior Valleys and Foothills Zone to the Grand Fir Zone. Forest Operational Inventory indicates the stands range in age from about 130 years of age to 160 years of age.

Portions of a 1986 timber sale were located in the same two sections. The cruise tally of the previous sale indicated a species composition of approximately 61 percent Douglas-fir, 32 percent incense-cedar and 4.5 percent grand fir. Ponderosa pine, sugar pine and western hemlock, combined, made up the remaining 1.5 percent of the stands. Again, because of proximity, a comparable species composition is expected in the proposed harvest units.

The understory is comprised of grand fir and suppressed incense cedar and ponderosa pine. Grasses are the dominant groundcover. Pacific madrone and California black oak are the principal hardwoods present. Ground cover is primarily grass, but may include ocean spray, western swordfern and poison oak.

In recent years there has been increased mortality in Douglas-fir throughout the South River Resource Area, caused by flat-headed fir borers (*Phaenops drummondi*) which typically attacks only dead and dying trees and is frequently found in trees that have already been killed by bark beetles. In southwestern Oregon, however, during periods of drought the borer attacks and kills apparently healthy Douglas-fir and true firs on drier sites, such as valley fringes where these proposed harvest units are located.

Commercial Thinning and Density Management Units

Stands proposed for commercial thinning and density management units in the General Forest Management Area, Connectivity/Diversity Blocks and associated Riparian Reserves are dense and even-aged stands, 40 to 70 years old. The proposed density management units in the Late-Successional Reserve range from approximately 40 to 60 years of age. Live crown ratios remain above 30 percent, and in all instances, canopy closure is 100 percent.

Relative stand densities currently range from 46 to 89 percent, with nearly two-thirds of the stands exceeding a relative density of 0.55. As a general rule, at a relative density of 0.55, competition among trees results in increasing suppression mortality and reduced tree vigor (Drew and Flewelling 1979).

Tree densities range from approximately 200 to 550 trees per acre, with quadratic mean diameters of 9 to 15 inches at breast height, and basal areas[4] of 140 to 290 square feet per acre.

[4] Basal area per acre is the sum of the cross-sectional area of all trees, inside the bark at breast height.

The proposed units are located in the Grand Fir, Western Hemlock, and Cool Douglas-fir/Western Hemlock vegetation zone. In all cases, Douglas-fir is the dominant species in terms of numbers. Other conifers present include western hemlock, grand fir, incense-cedar, ponderosa pine, and sugar pine. Scattered older remnant trees are found in the majority of the stands.

Golden chinkapin and Pacific madrone occur on drier slopes, with bigleaf maple and red alder present on moister slopes and north aspects. Ground cover and understory development are patchy and sparse, consisting of salal, evergreen huckleberry, Oregon-grape, rhododendron, vine maple, western hazel and western sword fern.

Armillaria ostoyae, a fungal root disease, is present in proposed Unit 29-3-27A in the Matrix allocations, and in proposed Units 30-4-29 B and 31-3-25A in the Late-Successional Reserve. The root disease primarily affects Douglas-fir and grand fir, and is creating small gaps and openings in the otherwise dense and closed canopies.

For young stands in the South Umpqua River/Galesville Late-Successional Reserve that are less than 80 years old, the average desired condition for coarse wood and downed logs in the Western Hemlock/Cool Douglas-fir vegetation zone is four pieces ≥ 24 inches in diameter and > 50 feet long. In the Douglas-fir/Chinkapin vegetation zone the average desired condition is two pieces per acre ≥ 17 inches in diameter and > 50 feet long. In both zones, the, the percent area covered by coarse wood should be ≥ eight percent. (LSRA p. 50) Only proposed Unit 31-4-13B meets percent ground cover objectives.

II. Wildlife

The two areas of concern for wildlife associated with the proposed action are Special Status Species and migratory birds.

A. Special Status Species

Two classes of Special Status Species receive particular consideration in BLM management actions. These are threatened and endangered species, as listed under the Endangered Species Act by the U.S. Fish and Wildlife Service, and BLM Sensitive species designated under Manual 6840.

Twenty-four special status wildlife species are known or suspected to occur on the Roseburg District. The timber management proposed in this environmental assessment would not be expected to affect 13 of these species for reasons described in Table B-1, *Appendix B - Wildlife*, and they will not be discussed further. The 11 remaining special status species that could be affected by the proposed action are discussed below.

Threatened and Endangered Species

The threatened **northern spotted owl** (*Strix occidentalis caurina*) is the only listed species expected in the analysis area. It is a long-lived forest-dwelling raptor that preys primarily on small mammals (Forsman et al. 1984), generally inhabiting forest stands with multiple shrub and canopy layers, large overstory trees, large snags, and accumulations of coarse woody debris.

Large broken-topped trees, cavities in trees and snags, or platforms in tree canopies provide nesting structures (Forsman et al 1984, Hershey et al. 1997). On the Roseburg District these habitat conditions and features are generally found in forest stands over 80 years old. Stands containing these features that provide for nesting, roosting, and foraging are referred to as suitable habitat. The proposed regeneration harvest units all contain nesting, roosting, and foraging components that make them suitable habitat.

Stands without nesting, roosting, and foraging components but with sufficient canopy cover and sub-canopy space for spotted owl movement are referred to as dispersal-only habitat. Forested areas that currently provide no function for spotted owls are called unsuitable habitat, and areas that will never provide for spotted owl use (*e.g.* rock outcrops or water bodies) are called non-habitat.

Because of their relatively small tree size, high tree density, and lack of nesting structure the proposed commercial thinning and density management units are primarily spotted owl dispersal-only and unsuitable habitat. Although large remnant trees and snags are present in many proposed units, a general lack of spatial connection and interaction between the remnant canopy and the secondary canopy makes use of the older remnant components unlikely.

Effects of habitat modification to specific spotted owl sites are assessed by assigning a generalized home range to each activity center. In the Klamath Mountains physiographic province it is represented by a 1.3-mile radius circle, and in the Western Cascades physiographic province by a 1.2-mile radius circle. Consultation with the U.S. Fish and Wildlife Service has identified 27 current or historic home ranges that overlap some portion of the project area. Current habitat availability is summarized in Table 3-2.

Information on the location and status of spotted owls in the project area is derived from annual demographic surveys conducted as a part of Northwest Forest Plan effectiveness monitoring (Lint et al. 1999). These surveys generally cover all suitable nesting, roosting and foraging habitat within one-quarter mile of each of the proposed timber management units, so the proposed action would not affect any unsurveyed suitable spotted owl habitat. Results of surveys for these sites over the past five years are illustrated in Table B – 2, *Appendix B – Wildlife*.

Known Owl Activity Centers are reserves approximately 100-acres in size centered on spotted owl sites identified prior to January 1, 1994. They were designated to preserve an intensively-used portion of the breeding season home range, and are managed as unmapped Late-Successional Reserves. One Known Owl Activity Center (P1994) is within 0.25 miles of proposed Unit 29-3-25G, as illustrated in Figure B-2, *Appendix B - Wildlife*.

Table 3-1
Acres, by type, of spotted owl habitat on BLM-managed land in affected home ranges.*

Site	Non-Habitat		Unsuitable		Dispersal Only		Suitable		Percent Suitable	
	Core	Home Range	Core	Home Range	Core	Home Range	Core	Home Range	Core	Home Range
ASH CREEK		20	70.9	459	84	242	272	586	54%	18%
AZALEA PEAK	16.7	27	116	409	266	566	42.3	770	8%	23%
BEAR PAW		2	75.9	437		231	191	1301	38%	39%
COFFEE CREEK			90.5	491		82	411	2143	82%	73%
COFFEE FORKS		5	34.3	388		130	300	1333	60%	45%
CORN CREEK NORTH		24	77.3	185		55	197	845	39%	29%
DAYBREAK			107	489	19.7	161	230	699	46%	21%
DECAF			117	450		59	385	2364	77%	80%
GRANITE CREEK		34		65		30	255	1105	51%	37%
GRATEFUL DEAD			88.6	981	64.8	351	349	1559	70%	53%
HYDE RIDGE		40	196	709	56.7	331	168	695	34%	21%
LOWER DAYS			96.7	384	50.6	264	119	829	24%	28%
MEL KAT			120	298	148	292	154	533	31%	18%
MILLER MINES		3	23	432	179	513	183	911	37%	27%
OSHEA CORNERS			138	568	30.6	309	115	916	23%	27%
OSHEA CREEK		2	88.8	573	24.8	127	203	1215	41%	36%
RONDEAU BUTTE		14	65.4	455	153	580	69.5	272	14%	9%
SHIVELY FORKS		3	128	503	85.6	472	187	503	37%	15%
SLIMER		11	35.5	500	230	846	20.3	459	4%	14%
ST JOHNS CREEK			70.2	561		138	194	964	39%	29%
STINGER GULCH			55.3	233	7.86	92	166	699	33%	21%
SWEAT CREEK	0.09	40	204	860	85	470	130	673	26%	20%
TATER HILL	5.37	27	41.9	349	55.3	658	399	1857	80%	63%
TURKEY CREEK		52	94.1	685	16.4	242	159	1175	32%	35%
UMPCOW		18	132	562	20.9	251	133	928	27%	28%
UPPER DAYS CREEK		32	29.5	436	11.2	124	346	1627	69%	55%
UPPER MAYS CREEK			64.5	218	94.4	222	256	510	51%	17%

*Percent Suitable reflects only BLM-administered acreage

Critical Habitat for the northern spotted owl was designated by the U.S. Fish and Wildlife Service (Federal Register 1992) and is defined as the habitat on which are found the physical and biological features essential to the conservation of the species. Critical habitat includes forest land that is currently unsuitable habitat, but has the capability of becoming suitable habitat in the future. Thirteen proposed commercial thinning and density management units are located within Critical Habitat Units OR-29 or OR-32 as illustrated in Table 3-3, and in Figure B-1 of *Appendix B - Wildlife*.

Table 3-2 Proposed units in northern spotted owl Critical Habitat Units (CHU).

Unit	CHU	Harvest Type
29-2-08A	OR-29	Commercial Thinning
29-2-17A	OR-29	Density Management
29-2-18A	OR-29	Commercial Thinning
29-2-19A	OR-29	Commercial Thinning
30-4-33A	OR-32	Density Management
31-3-25A	OR-32	Density Management
31-4-09A	OR-32	Density Management
31-4-13A	OR-32	Density Management
31-4-13B	OR-32	Density Management
31-4-21A	OR-32	Density Management
31-4-23A	OR-32	Density Management
31-4-23B	OR-32	Density Management
31-5-25A	OR-32	Density Management

Woodrats (*Neotoma* spp.) are the primary spotted owl prey in the South River Resource Area. Research has shown that woodrats account for 45 to 70 percent of the prey biomass consumed by spotted owls in southwest Oregon, particularly in drier forests such as those in the project area (Forsman et al. 1984, Carey et al. 1992, Forsman et al. 2004).

Other prey include the northern flying squirrel (*Glaucomys sabrinus*, about 14 percent of prey biomass), Oregon red tree vole (*Arborimus longicaudus*,1 to 2 percent of prey biomass), brush rabbit (*Sylvilagus bachmani*, 6 to 22 percent of prey biomass), deer mouse (*Peromyscus maniculatus*, about one percent of prey biomass), and Western red-backed vole (*Clethrionomys occidentalis*, 1 to 3 percent of prey biomass) (Forsman et al. 1984, Carey et al. 1992, Forsman et al. 2004).

Barred owls (*Strix varia*) are closely related to spotted owls and have expanded their range into the South River Resource Area over the past 20 years. They are typically more aggressive than spotted owls and can displace them through territorial interactions. This direct competition can reduce availability of suitable habitat available for spotted owls. Opportunistic detections of barred owls have been made during spotted owl surveys in the South Umpqua River fifth-field watershed since 1987, when a single male was detected in the Turkey Creek home range. Since then, barred owls have been detected in 18 of the spotted owl home ranges identified above in Table 3-4.

Barred owls have established a nest site in the Turkey Creek home range and produced fledglings in 1992, 1995, 1997, 1999, 2000, 2001, 2003, and 2005. Barred owl fledglings were also detected in the Oshea Corners home range in 2005. This indicates barred owls have established themselves in the watershed and are likely to increase their numbers.

BLM Bureau Sensitive Species

BLM Manual section 6840, states that Bureau actions must not contribute to the need to list BLM Special Status Species (SSS) under the Endangered Species Act. The Special Status Species list (http://www.or.blm.gov/isssp/) was last updated in January 2008.

Bald eagles (*Haliacetus leucocephalus*) feed on a variety of prey that includes fish, waterfowl, and carrion. They are migratory and have been observed to both overwinter and nest on the Roseburg District, although no nesting pairs are documented on lands within the South River Resource Area. Bald eagles typically choose large trees with open canopies near large bodies of water for nesting, and are sensitive to disturbance while nesting (Buehler 2000, Isaacs and Anthony 2004). Proposed regeneration harvest Units 30-4-3A, 30-4-3B, and 30-4-4A contain potential nest trees with a commanding view of the South Umpqua River.

Chace sideband (*Monadenia chaceana*) and **Oregon shoulderband** (*Helminthoglypta hertlieni*) snails are mollusks endemic to northwestern California and southwestern Oregon. Their principal food sources are believed to be leaf litter, fungi, and/or detritus. These species require refugia from desiccation during dry periods. This may include crevices in rock-on-rock habitat, soil fissures, or the interior of large woody debris (Weasma 1998*a*, Weasma 1998*b*, Frest and Johannes 2000). When active, they can be found on leaf litter, herbaceous vegetation, ferns, or moss mats in moist, shaded areas near refugia.

The **Crater Lake tightcoil** (*Pristiloma articum crateris*) is a microsnail found in perennially wet habitats, such as springs, seeps, and wetlands, at elevations above 2000 feet throughout the Oregon Cascades. Habitat features used by the snail include large woody debris, rocks, ground vegetation, moss, and uncompacted soil (Duncan et al. 2003). Potential habitat is present in proposed commercial thinning Unit 29-3-35A.

The **fringed myotis** (*Myotis thysanodes*) is an insectivorous bat found throughout the western U.S. It appears to utilize a range of habitats, from sagebrush to Douglas-fir forest (reviewed in Verts and Carraway 1998). Known hibernacula and roosts include caves, mines, buildings, and large snags (Weller and Zabel 2001). It is thought that Oregon populations migrate in winter, though definitive evidence is lacking.

The **Pacific pallid bat** (*Antrozous pallidus pacificus*) is an insectivorous bat found throughout the Southwest, southern Rocky Mountains, and Pacific Northwest. It generally uses arid or semi-arid environments with rock, brush, or forest edge habitat (reviewed in Verts and Carraway 1998). Known hibernacula and roosts include caves, mines, rock crevices, bridges, buildings, and hollow trees or snags (Lewis 1994).

The **Townsend's big-eared bat** (*Corynorhinus townsendii*) is an insectivorous bat found throughout the western U.S. and the Ozark and Appalachian Mountains. It is associated with a variety of habitats, including desert scrub, pinyon-juniper, and conifer forest (reviewed in Verts and Carraway 1998). Townsend's big-eared bats typically roost and hibernate in mines and caves, but have been found roosting in hollow trees as well (Fellers and Pierson 2002)

All three of these bat species may utilize large remnant trees, where present in the proposed units, for foraging and roosting opportunities. Additionally, abandoned mine workings are present in proposed Unit 31-4-21A that may provide suitable hibernaculae.

The **harlequin duck** (*Histrionicus histrionicus*) breeds and nests along larger, fast-flowing inland streams before migrating to coastal Canada and Alaska to overwinter. It feeds on terrestrial and aquatic invertebrates and fish eggs (Thompson et al 1993, Robertson and Goudie 1999). They nest on the ground, in tree cavities, on cliffs or on stumps, usually within 5 meters of water. Suitable nesting habitat may be present where proposed commercial thinning Units 29-3-27A, B, and C border Days Creek.

The **purple martin** (*Progne subis*) is the largest North American swallow (Family *Hirundinidae*). It breeds throughout the eastern U.S., coastal areas of the Pacific Northwest, and the southern Rocky Mountains. Purple martin nests are typically found in open areas near water (Brown 1997, Horvath 2003). Although many purple martins nest in birdhouses or other artificial structures, others nest in tree cavities. Snags with woodpecker cavities are thought to be the most important habitat features for these populations (Brown 1997). The project area could provide foraging and roosting opportunities where large snags or trees with cavities are present.

B. Migratory Birds

Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds," directs agencies, including the BLM, to integrate bird conservation principles, measures, and practices into agency planning processes to restore and enhance habitat of migratory birds, as practicable, and ensure that environmental analysis considers effects of agency actions and plans on migratory birds, with emphasis on species of concern.

Species addressed were identified from "Birds of Conservation Concern" and "Game Birds Below Desired Condition," as defined by the U.S. Fish and Wildlife Service (USDI, USFWS 2004a), and Partners In Flight's *Conservation Strategy for Landbirds in Coniferous Forests of Western Oregon and Washington* (Altman 1999).

Partners In Flight is an international coalition of government agencies, conservation groups, academic institutions, private organizations, and citizens dedicated to long-term maintenance of healthy populations of native landbirds. Their conservation plan is one of many that may be used as guidelines by private and government organizations, including the BLM.

The harlequin duck is addressed above. Lewis' woodpecker, marbled murrelet, peregrine falcon, and vesper sparrow are eliminated from further discussion because habitat is not present in the project area. Habitat for flammulated owls, short-eared owls, wood ducks and northern harriers would not be affected by the proposed action.

Vaux's swift is an aerial insectivore that forages above the forest canopy and in forest openings. The species is associated with old-growth forest and uses large trees with cavities and hollow snags for nesting. Many other primary and secondary cavity nesting species use similar habitat attributes.

The **brown creeper** is a bark-gleaning insectivore associated with late-seral forest habitat. It forages on the largest trees, particularly those with deeply fissured bark, and is thought to respond negatively to forest fragmentation. Other species using similar habitat are the red-breasted nuthatch, golden-crowned kinglet, chestnut-backed chickadee, and pine siskin.

Red crossbills forage on conifer cones, most often in mature and old-growth stands, where cones are produced most abundantly, and travel widely, if necessary, to find adequate cone crops. Other species associated with these habitat attributes include the evening grosbeak and purple finch.

The **pileated woodpecker** uses large snags and defective trees in mature and old-growth forest for foraging and nesting, and also forages on large stumps and logs. Many other primary and secondary cavity nesting species use these same habitat attributes.

The **hermit warbler** is a foliage-gleaning species that forages in stands of various ages that have well-developed, closed canopies with high foliage volume. The golden-crowned kinglet and chestnut-backed chickadee also use this type of habitat.

The **Pacific-slope flycatcher** is an aerial insectivore that forages in deciduous canopy below the dominant overstory of closed-canopy stands, particularly in association with wet or riparian areas. The species is most abundant in mature and old-growth stands. The warbling vireo, black-headed grosbeak, and black-throated gray warbler are also associated with these habitats.

Wilson's warbler is a foliage-gleaning insectivore that uses deciduous shrub and subcanopy layers in a wide range of forest age classes, but also uses early-seral shrub habitat. Swainson's thrush and warbling vireo use similar habitats.

Winter wrens forage on the ground and low understory in structurally complex areas, commonly in older forest containing shrubs, rootwads, down logs, ferns, and herbaceous vegetation. It is thought to be an interior species sensitive to stand fragmentation. Orange-crowned warblers and rufous hummingbirds use similar habitat attributes.

The **olive-sided flycatcher** is an aerial insectivore that inhabits forest edges between mature and early-seral stands, and large openings in late-seral forests. It uses tall trees and snags for singing and foraging perches. Species using similar habitat include the western tanager, Stellar's jay, purple finch, and western wood-peewee.

The **orange-crowned warbler** is a foliage-gleaning insectivore. It primarily forages on deciduous shrubs and trees in early-seral habitat, but also uses older stands where well-developed deciduous vegetation is present. MacGillvray's warbler, willow flycatcher, and wrentit use similar habitats.

The **rufous hummingbird** uses early-seral habitat and openings in old-growth forest where there is diversity and abundance of nectar-producing flowering vegetation. It requires open space for courtship displays. MacGillvray's warbler, willow flycatcher, and wrentit use similar habitats.

The **band-tailed pigeon** is a fruit- and seed-eating bird widely distributed across North and South America. Nesting in Oregon is generally in mature, closed canopy conifer stands, while more open forest stands and agricultural lands are used for foraging. Band-tailed pigeons travel widely in search of food, giving the species a nomadic nature.

Mourning doves range across North and Central America. This species uses a variety of habitats, including forest, desert, shrub/scrub, suburban areas and agricultural lands. Mourning doves forage in areas with little ground cover, and nest in edge habitats between forest/shrubs and open areas.

A variety of **raptor species** may also be present in the project area, including but not necessarily limited to northern goshawks, red-tailed hawks, Cooper's hawks, sharp-shinned hawks and barred owls. All of these species nest in a range of forested environments. Most hunt below the forest canopy, although red-tailed hawks typically hunt in more open country such as meadows and pastureland.

III. Fisheries, Aquatic Habitat and Water Resources

The South Umpqua River fifth-field watershed has a Mediterranean-type climate with cool, wet winters and hot, dry summers. Annual precipitation varies with elevation and ranges from 30 to 60 inches within the project area (SUWA, Map 24, p. 120). Most precipitation occurs as rain; but snow is likely at higher elevations in most years. Stream flow volumes are closely correlated with the precipitation pattern. Peak flows occur between November and March, and low flows from July to October. Streams located within proposed units are generally first and second order headwater streams that are principally intermittent in nature with no surface flow during the dry season. Perennially flowing third order streams are present in proposed Units 31-4-29B and 30-3-15A.

A. Fish Species, Coho Critical Habitat, and Essential Fish Habitat

Salmonid species found in the watershed include winter-run Oregon Coast steelhead trout and resident rainbow trout (*Oncorhynchus mykiss*), resident and sea-run Coastal cutthroat trout (*O. clarki clarki*), fall and spring Oregon Coast Chinook salmon (*O. tshawytscha*), and the Oregon Coast coho salmon (*O. kisutch*).

Federally-Threatened Species

On February 12, 2008, the National Marine Fisheries Service published a Notice of Intent proposing to list the Oregon Coast coho salmon as a threatened species under the Endangered Species Act (Federal Register 2008). The listing became effective on May 12, 2008.

Coho salmon are present in the South Umpqua River and many larger tributaries along the course of the river. Three units (30-3-15A, 29-3-27A and 29-3-27B) are located along Days and Saint John Creek, adjacent (within 320 ft) to stream reaches inhabited by coho salmon. None of the remaining units are adjacent to occupied stream reaches.

Critical Habitat

Critical Habitat was concurrent with the listing of the Oregon Coast coho salmon. Streams described above, are designated as Critical Habitat.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 (Federal Register 2002) designated Essential Fish Habitat for fish species of commercial importance. Essential Fish Habitat consists of streams and habitat currently or historically accessible to Chinook and coho salmon. Essential Fish Habitat for coho salmon in the watershed is coincident with coho salmon distribution and critical habitat.

Bureau Sensitive Species

The Oregon Coast steelhead trout Evolutionary Significant Unit was previously proposed as a candidate for threatened species designation (Federal Register 1998), however the National Marine Fisheries Service determined that listing was not warranted.

In 2005, the National Marine Fisheries Service designated steelhead trout as a Species of Concern (Federal Register 2005). Steelhead trout are present in the watershed where their distribution includes stream reaches utilized by coho salmon, but typically extends into smaller order streams above those used by coho salmon.

The Umpqua chub (*Oregonichthys kalawatseti*) is a Bureau Sensitive Species found predominantly in larger order streams and rivers throughout the Umpqua River Basin (Markle et al. 1991). Umpqua chub are present in the main-stem of South Umpqua River the entire length of the watershed.

B. Aquatic Habitat and Water Quality

Aquatic Habitat Inventory surveys dating to 1992 were conducted in the South Umpqua River fifth-field watershed by the Oregon Department of Fish and Wildlife (ODFW). A total of 103 stream reaches comprising about 108 miles were surveyed on lands administered by the BLM, private industrial timberlands, and residential lands. Based on surveys conducted on reference stream reaches, ODFW has set benchmarks for aquatic habitat conditions (Foster et al. 2001).

Surveys focused on valley bottom and higher order channels. Headwater reaches and tributaries adjacent to the proposed timber management units generally were not surveyed. Information from these surveys in addition to more recent site specific surveys conducted by BLM fishery biologists help set a baseline reference habitat condition for streams in the watershed

Water quality standards are determined for each water body by the Oregon Department of Environmental Quality. Water bodies that do not meet water quality standards are placed on the state's 303(d) list as Water Quality Limited (ODEQ 2008).

Substrate/Sediment

Substrate condition

Availability of spawning substrate is important to fish productivity. Suitability of spawning habitat varies with the amount, size and quality of substrate. Gravel and small cobble substrate (Bell 1986) that is relatively free from embedded fine sediment is ideal spawning substrate for resident and anadromous salmonids.

In reaches where spawning size gravel is present, fines in excess of 20 percent may limit the quality of spawning redds. During incubation of eggs and alevin growth, fine sediment can fill interstitial spaces reducing oxygen flow to eggs or form an armor layer preventing emergence of alevin (Waters 1995).

Riffles are considered in "desirable" condition when they contain less than 10 percent silt, sand and organics and greater than 35 percent gravel. Of the surveyed reaches, 50 met the desirable criteria for the amount of sand and organic material in riffle units. Sixty-one reaches met the desirable criteria for the amount of gravel in riffle units.

Sediment Sources

Studies (Reid 1981; Reid and Dunne 1984) have shown that forest roads can be major contributors of additional fine sediment to streams. Roads can be hydrologically connected to stream channels at roads crossings, where discharge is sufficient create gullies in the roadside ditch, and where road fillslopes may encroach on streams. Roads may directly alter streams by increasing erosion and sedimentation, which in turn may alter channel morphology (Furniss, et al. 1991).

Roads can act as a link between sediment sources and streams, and often account for most of the sediment problems in a watershed. This additional sediment can reduce water quality for domestic use and cause detrimental changes to streams and aquatic inhabitants (Castro and Reckendorf 1995).

Fish-bearing stream crossings are in generally good condition and are primarily located on flat road grades and approaches. Stream crossings over South Myrtle Creek, the South Umpqua River and Beals Creek are on paved sections of road, while other road segments crossing fish-bearing streams have gravel surfacing in good condition.

Vegetated ditches can catch most fine sediment that would otherwise impair downstream fish habitat (Bilby 1985). Ditches appeared well vegetated with adequate cross drain relief to prevent concentration of ditch runoff. Roads on or near ridge tops are far from fish-bearing streams and possess no mechanism to transport sediment to stream channels.

Large Woody Debris

Large woody debris is important in the formation of deep scour pools and retention of gravel substrate (Bilby and Ward 1989). These pool and off-channel habitats provide refuge habitat for juvenile and resident salmonids during high flow events and cool water sources during dry months (Swanston 1991).

Surveyed streams were generally lacking in large woody debris. ODFW considers reaches in desirable condition when they contain greater than 30 m^3 of large wood per 100 meters. Of the 103 surveyed reaches 17 met the desirable criteria for the volume of large woody debris pieces. The benchmark for the number of "key" pieces, those greater than 33 ft long and 24 inches in diameter, is three per 100 meters. There were only two reaches that meet the desirable criteria for the number of key pieces of large woody debris.

High gradient headwater intermittent and perennial streams found adjacent to units generally had a higher volume and number of pieces of large woody debris than ODFW surveyed reaches. Habitat forming large woody debris pieces ranged from large logs greater than 24 inches to small hardwoods. Steeper, confined valleys in these headwater streams lead to more contribution from adjacent riparian stands (May and Gresswell 2003) and absent large flows woody debris is retained in the stream for longer periods of time.

Pool Quality

Pools are important habitat for juvenile rearing, both during low flow months when high stream temperatures add to stress and during high flow events when off-channel pools provide refuge. Salmonids are found in greater densities (Roni 2002) and larger size (Rosenfeld et al. 2000) in deep pool habitats.

ODFW considers reaches in a desirable condition when they contain greater than 35 percent pool by area and have greater than 2.5 complex pools (those having a large wood component) per kilometer. Of the 103 surveyed reaches 28 met the desirable criteria for pool area and 18 met the criteria for numbers of complex pools.

Habitat Access

Access to migrating fish can be restricted at stream crossings where culvert outlet jumps exceed six inches or the outlet pool depth is less then 1.5 times the height of the jump. Adult fish are capable of jumping in excess of four feet. Upstream migration by juvenile fish, however, is often blocked by jumps in excess of six inches. Culverts sized to less than bank-full width or installed with gradients in excess of one-half percent can also limit fish passage by accelerating water velocities within the pipes (OWEB 1999).

No stream crossings on BLM-controlled roads accessing the proposed timber management units were noted as barriers to fish passage, and none of the proposed road construction or renovation described in this assessment would create circumstances blocking fish passage. It is acknowledged, though, that there are stream crossings on BLM-controlled and private roads throughout the watershed are barriers to migration.

Water Temperature

Water quality standards are determined for each water body by the Oregon Department of Environmental Quality. Water bodies not meeting these standards are placed on the Oregon 303(d) list as Water Quality Limited (ODEQ 2008). The following water bodies in the analysis area are identified as limited for exceeding temperature standards: Fate Creek, Coffee Creek, Stouts Creek, East Fork Stouts Creek, Shively Creek, Lavadoure Creek, the South Umpqua River and Days Creek. Of these listed waters, only Days Creek is adjacent to any proposed timber management units.

Water temperature is a key factor affecting growth and survival of aquatic organisms. Effects of stream temperatures on fish, amphibians and macroinvertebrates will vary by species and within the life cycle of a given species (Lantz 1971). Factors influencing water temperature include elevation, slope, aspect, local topography, stream flow patterns, channel geometry, vegetation, stream shading, and distance from headwaters.

The most common cause of elevated stream temperatures associated with timber harvest is a reduction in streamside shade that may cause stream surfaces to be more susceptible to solar radiation (Moore and Miner 1997). Streams in or adjacent to the proposed timber management units were determined by ocular estimates to be well shaded with dense stands of conifers and hardwoods.

Peak Flows

Transient Snow Zone

In the analysis area the Transient Snow Zone lies between 2,000 and 5,000 feet in elevation and may alternately receive snow or rain during the winter months. Higher than normal peak flows can result from timber harvest in the Transient Snow Zone (Harr and Coffin, 1992) where the openings created may allow abnormally high accumulations of snow to form. Warm rain-on-snow events can melt this increased snow pack quickly and create higher than normal flows.

Present risk of peak flow enhancement resulting from past timber harvest in the South Umpqua River fifth-field watershed was evaluated using a model recommended in the Oregon Watershed Assessment Manual (OWEB 1999. p. IV-11). It predicts increases in peak flow based on acres in a watershed located in the Transient Snow Zone and percentage of this area with less than 30 percent canopy closure.

Aerial photo interpretation and Geographic Information Systems (GIS) analysis of vegetative conditions in the sixth-field sub-watersheds that comprise the South Umpqua River fifth-field watershed indicate that although past timber harvest and road construction have created canopy openings, over 90 percent of the forested lands in the Transient Snow Zone have canopy closures exceeding 30 percent and the potential for peak flow enhancement from rain-on-snow events in these areas is low.

Approximately 783 acres of the proposed timber management units are in the Transient Snow Zone, while the remaining acres are below in the rain dominated zone. Areas within each subwatershed located in the Transient Snow Zone and the percentage of those areas currently in openings, as well as the threshold for increased risk of peak flow enhancement are presented below in Table 3-4.

Table 3-3 Acres, Percent of Area, and Percent of Openings in the Transient Snow Zone.*

Subwatershed	Total Forest Acres	Percent Forested Acres in TSZ	Percent of TSZ in Openings	Threshold for Increased Risk
Canyon Creek	22,768	59%	4%	55%
Shively Creek	12,180	53%	2%	65%
O'Shea Creek	11,379	33%	1%	85%
Stouts Creek	13,997	61%	3%	55%
Saint John Creek	9,427	48%	5%	65%
Days Creek	17,746	29%	8%	85%
Coffee Creek	11,046	67%	9%	50%
Corn Creek	10,370	40%	2%	75%
Summary for South Umpqua River Watershed (5th Field HUC)	**108,913**	**49%**	**4%**	**65%**

*Based on GIS analysis and aerial photo interpretation (GIS data from Healy et al. 2005).

Roads

Roads can increase the drainage density of a watershed, acting as a preferential pathway for surface water runoff. This can result in a decrease in the volume of overland flow that infiltrates into ground water or soil water storage (Furniss, et al. 1991). This can also increase the rate at which runoff leave a basin, resulting in higher peak flows in times of snow melt or rainfall and reduced stream flows in late summer. The magnitude of peak flow enhancement also depends on whether or not road segments drain directly into stream channels. Roads not connected to stream channels or those with drainage that efficiently directs surface flow to the forest floor, allowing it to infiltrate into the ground water system, have negligible effects on flow magnitude and timing.

Peak flows have been shown to increase substantially when roads occupy more than 12 percent of a watershed (OWEB 1999 p. IV-15). Roads presently occupy less than five percent of the area in the South Umpqua River fifth-field watershed, and it is unlikely peak flows are being measurably affected by current road densities.

C. Water Rights

Surface water rights for domestic use (Permit No. S 47527) exist within one mile downstream of proposed Unit 30-3-23A in the SE¼NW¼ Section 26, T. 30 S, R. 3 W.

IV. Botany

A. Vascular Plants, Lichens and Bryophytes

Based upon habitat conditions in the proposed timber management units and surveys previously conducted in comparable forest habitat elsewhere in the South River Resource Area, there are four Special Status vascular plants whose presence may be considered a reasonable possibility. These are the Federally-threatened Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*) and Bureau Sensitive tall bugbane (*Cimicifuga elata*), wayside aster (*Eucephalis vialis*) and Oregon Bensoniella (*Bensoniella oregano*.)

Kincaid's lupine is an herbaceous perennial that reproduces by seed. It is native to the prairies of the Willamette Valley and southwestern Washington, and found in forest openings, meadow gaps, and along forest fringes in Douglas County, Oregon. (Menke and Kaye 2003)

Tall bugbane is a temperate herbaceous perennial found in wooded areas, primarily on north-facing aspects. It has been found on sites in the South River Resource Area in all stages of forest succession. Its frequent association with deciduous trees also suggests that it may respond to gaps created in conifer forest (Kaye and Kirkland 1993).

Wayside aster is most commonly found in canopy gaps, on edges where forest and meadows meet, and in clearcuts (Gammon 1986). As is the case with tall bugbane, wayside aster has been found in the South River Resource Area on sites in all stages of forest succession.

Oregon Bensoniella is a rhizomatous perennial herb found along the margins of meadows and springs in mixed coniferous forests in partial and full sun (Copeland 1980).

There are an additional 58 Special Status vascular plant, lichen and bryophyte species whose acknowledged range includes the Roseburg District (see *Appendix C – Botany*). Habitat for 16 of these species is not present in the analysis area and they will not be discussed further.

Habitat capable of supporting the remaining 42 species is present. Surveys would be conducted, but the results of previous surveys in the South Umpqua River fifth-field watershed and other adjoining watersheds indicate a low probability of detection.

B. Fungi

There are 11 Bureau Sensitive fungi documented on the Roseburg District, consisting of *Cudonia monticola, Dermocybe humboldtensis, Gomphus kuffmanii, Leucogaster citrinus, Otidea smithii, Phaeocollybi californica, P. spadicea, P. olivacea, Ramaria largentii, R. spinulosa* var. *diminutiva,* and *Sowerbyella rhenana*.

Twelve additional species consisting of *Helvella crassitunicata*, *Phaeocollybi dissilens, P. gregaria, P. oregonensis, P. pseudofestiva, P. scatesiae, P. sipei, Pseudorhizina californica, Ramaria amyloidea, R. gelatiniaurantia, Rhizopogon chamaleontinus,* and *R. exiguus*, are suspected based on habitat and host species present.

These 23 fungi are primarily associated with the *Pinaceae* family, principally Douglas-fir and western hemlock. Important habitat components include: dead wood; dead trees; live, mature trees; many shrub species; a broad range of microhabitats; and for many, a well-distributed network of late-seral forest with moist, shaded conditions.

No Bureau Sensitive fungi have been identified in the South Umpqua River fifth-field watershed.

Most Special Status fungi species are highly isolated in their occurrence. They produce short-lived, ephemeral sporocarps or fruiting structures that are seasonal and annually variable in occurrence (USDA and USDI 2007 p. 191). Richardson (1970) estimated that sampling every two weeks would fail to detect about 50 percent of macrofungal species fruiting in any given season. In another study (O'Dell 1999) less than ten percent of species were detected in each of two consecutive years at any one of eight sites.

V. Soils

Soils in the project area developed from a wide range of geologic material. Main components include metamorphic rock, such as slate, extrusive volcanic rock with small crystalline structure, and intrusive volcanic material with medium to large crystalline structure, mainly granodiorite (Johnson et al. 2004, Walker and MacLeod 1991, Wells et al. 2000). Small areas of sedimentary rock and highly metamorphosed and fractured rock such as mica schist also exist within the project area.

Soils derived from metamorphic, extrusive volcanic and sedimentary rock are mostly competent materials with little evidence of movement, except for occasional soil creep on slopes of 70 to 90 percent. They are moderately deep to deep on convex and smooth slopes, with moderately high percentages of gravels, as a general rule.

In contrast, soils that developed from granodiorite are more deeply weathered and deep to very deep over soft to moderately hard bedrock, on gentler concave and convex slopes, or hummocky bench topography. They are low in gravel content and high in clay content. These granitic soils also have a greater potential for surface erosion.

Some small slides have occurred in the past, typically less than a tenth-acre in size, on steeper granitic slopes and in areas of highly fractured and weathered metamorphic rock. Well-vegetated to partially vegetated scarps and shallow slope failures are present in proposed Units 29-3-27B, 29-3-27C, 30-4-33A, and 31-4-13B. In proposed Unit 29-2-17A, a shallow debris slide occurred below a road fill and culvert between 1977 and 1999. The revegetate failure appears to have resulted from over-steepened side cast material and a culvert that drained onto the fill.

Proposed regeneration harvest Units 30-4-3A and 30-4-4A contain areas of granitic soils on slopes in excess of 35 percent that encompass an estimated 36 percent and 45 percent of the respective unit acres. Granitic soils on slopes over 35 percent are considered Category 1 soils that are highly sensitive to the effects of prescribed burning (USDI 1988, BLM Handbook 1734-1). Category 1 soils also include soils of non-granitic parent material on slopes steeper than 70 percent. Proposed regeneration harvest Units 29-3-25D, 29-3-25E, 29-3-25F and 29-3-25G contain steep slopes of this nature that comprise from approximately one-quarter to two-thirds of the respective unit areas.

Other soils in these proposed units, and in Units 30-4-3B and 30-4-4B, are Category 2 soils, which are considered moderately sensitive to the effects of prescribed burning.

VI. Fuels Management/Fire Risk and Air Quality

A. Fuels Management/Fire Risk

Fine fuels are most susceptible to ignition and most responsible for rate of fire spread. These are referred to as 1-hour (< ¼-inch diameter), 10-hour (¼ to 1 inch in diameter) and 100-hour (1 to 3 inches in diameter) fuels. The hours correspond to the length of time it takes the moisture content of individual fuels to reach equilibrium with changes in relative humidity. Large fuels are those greater than 3 inches in diameter and are most responsible for fire intensity, duration and difficulty of control. Larger fuels are typically described as 1000-hour or 10,000- hour fuels because of the lengthy time required to reach equilibrium with changes in relative humidity.

Proposed Units 29-3-27A and B, 30-3-21A and B, 30-3-21C, and 30-3-23A, located in the Wildland Urban Interface. Existing fuel conditions are best described by descriptive code 1-MC-3 of *Photo Series for Quantifying Natural Residues in Common Vegetation Types of the Pacific Northwest* (Maxwell and Ward, 1980). Fuel loading is estimated at 11.1 tons/acre, distributed as follows: 1-hour, 0.7 tons/acre; 10-hour, 1.1 tons/acre; 100-hour, 1.5 tons/acre; and large fuels, 7.8 tons/acre. Approximately 55 percent of unit surface area is fuel-covered to an average depth of one inch.

In proposed Units 29-3-27C and 29-3-33B, descriptive code 2-MC-3 is typical of existing conditions. Total fuel load is approximately 20.4 tons/acre and distributed as follows: 1-hour, 0.5 tons/acre; 10-hour, 1.8 tons/acre; 100-hour, 3.5 tons/acre; and large fuels, 14.6 tons/acre. Fuels cover approximately 73 percent of unit surface area, to an average depth of two inches.

In proposed Units 31-4-21A descriptive code 2-MC-2 is typical of existing conditions. Total fuel load is approximately 10.8 tons/acre and distributed as follows: 1-hour, 0.5 tons/acre; 10-hour, 1.3 tons/acre; 100-hour, 3 tons/acre; and large fuels, 6 tons/acre. Fuels cover approximately 76 percent of unit surface area, to an average depth of two inches.

Four of eight proposed regeneration harvest (30-4-3A, 30-4-3B, 30-4-4A and 30-4-4B) are in the Wildland Urban Interface, while the remainder (29-3-25D, 29-3-25E, 29-3-25F and 29-3-25G) are outside this boundary as delineated in the Roseburg Fire Management Plan and the Days Creek Community Wildfire Protection Plan.

Fuel loading in the units in Sections 3 and 4, T. 30 S., R. 4 W., using the photo series noted above, is best characterized by descriptive codes 1-DF-4, 1-MC-3, and 3-DFHD-4. Total fuel loads range from 11 to 14 tons per acre, primarily composed of larger size classes. The present risk for wildfire is considered low to moderate based on existing fuels load, stand characteristics, and understory vegetation that could contribute to fire spread.

Fuel loading in the proposed regeneration harvest units in Section 25, T. 29 S., R. 3 W. is best characterized by descriptive codes 1-MC-4, 1-DF-4, and 2-DF-4 with fuel loads that range from 14 to 21 tons per acre.

B. Air Quality

The Oregon Smoke Management Plan identified areas of air quality concern and established Designated Areas where smoke intrusion should be avoided. The only Designated Area in proximity to the proposed timber sale areas is Roseburg, Oregon, located to the northwest.

VII. Cultural and Historical Resources

Proposed Units 30-4-3A, 3B, 4A and 4B have been previously examined on the ground and determined not to contain any cultural resources. There are no known cultural resources within any of the remaining units. However, no inventories have been conducted as yet. These are expected to be completed in the spring and summer of 2008.

If resources are discovered during inventory, several options are available to address them. The first would be to avoid the resources by reconfiguring units or relocating roads. If that option is not viable the resources would need to be evaluated to determine their significance[5]. If the resources were not significant, the project could proceed as designed. If the resources were significant, they would need to be avoided or impacts mitigated by recovering a portion of the information that they contain. Development of a mitigation or treatment plan would require consultation with interested Tribal governments and the State Historic Preservation Office to determine appropriate measures to be implemented.

Consequently, no adverse effects to cultural or historical resources are anticipated and they will not be discussed further in this assessment.

VIII. Recreation Opportunities and Visual Resources

The proposed timber management areas are interspersed with residential properties and lands primarily managed for timber and agricultural production. There are no developed recreational facilities or proposed developments in the timber sale areas.

Recreational use is limited to areas where public access is available over roads wholly under the control of the BLM. Recreational opportunities are of a dispersed nature, such as hiking, picnicking, wildlife observation, and hunting.

[5] Significance refers to the value of the resource as defined in the National Historic Preservation Act and its implementing regulations, rather than effects as described in the National Environmental Policy Act and the implementing regulations of the Council on Environmental Quality.

It is not anticipated that these pursuits would be precluded as opportunities are abundant throughout the Roseburg, Coos Bay and Medford Districts of the BLM, the Umpqua National Forest and Crater Lake National Park. Consequently, these recreational activities will not be discussed further in this assessment.

Off-highway vehicle use is "limited" to existing roads and designated trails. This was a decision made by the ROD/RMP (p. 58) that is beyond the scope of this environmental assessment to address. Other forms of off-highway vehicle use are not authorized and cannot be assessed as doing so would entirely speculative in nature.

The areas in which timber management is proposed are principally classified as Visual Resource Management (VRM) Class IV, with the only exceptions being one proposed density management unit in Section 21 and two in Section 23, T. 31 S., R. 4 W., and one in Section 25, T. 31 S., R. 5 W. that are on lands classified VRM II. No specific visual management constraints are applicable to lands managed for VRM IV objectives (ROD/RMP, p. 53).

Management of VRM II lands allows for low levels of change, to the characteristic landscape, that should not attract the attention of the casual observer. The variable density nature of the treatments proposed for these two units, 25 percent of the aggregate acres in unthinned areas, would retain high numbers of trees per acres that would not create a stark contrast with other forested stands, nor be expected to catch the attention of the casual observer. Consequently, visual resources will not be discussed further in this assessment.

IX. Noxious Weeds and Invasive Non-Native Plants

There are scattered infestations of noxious weeds and non-native plants throughout the South Umpqua River fifth-field watershed. On BLM-managed lands and along many access roads the two most common are Himalayan blackberry and Scotch broom.

As discussed in Chapter Two (p. 17), actions taken to contain, control and eradicate existing infestations are undertaken independent of timber management actions through implementation of the *Roseburg District Integrated Weed Control Plan and Environmental Assessment* (USDI, BLM 1995b). Activities include inventorying weed infestations, assessing risk for spread, and applying control measures in areas where management activities are planned. Control measures may include releasing biological agents, mowing, hand-pulling, and the use of approved herbicides. Noxious weed treatments would be undertaken regardless of whether or not the proposed action is implemented.

Management practices described in Chapter Two (p. 16) that would be implemented in conjunction with the proposed timber management plan would focus on preventing introduction of new infestations or spread of existing ones.

As a consequence negligible changes in noxious weed populations would be expected under either alternative, and no further discussion is necessary in this analysis.

Chapter Four
Environmental Consequences

This chapter discusses specific resource values that may be affected by the alternatives being analyzed. It addresses the nature of short-term and long-term effects, including those that are direct, indirect and cumulative, that may result from implementation of the alternatives. The discussion is organized by individual resources, addressing the interaction of the effects of the proposed timber management plan with the current baseline conditions of this environment. It describes potential effects, how they might occur, and the incremental result of those effects, focusing on direct and indirect effects with a realistic potential for cumulative effects, rather than those of a negligible or discountable nature.

The Council on Environmental Quality (CEQ) provided guidance on June 24, 2005, as to the extent to which agencies of the Federal government are required to analyze the environmental effects of past actions when describing the cumulative environmental effect of a proposed action in accordance with Section 102 of the National Environmental Policy Act (NEPA). CEQ noted the "[e]nvironmental analysis required under NEPA is forward-looking," and "[r]eview of past actions is only required to the extent that this review informs agency decisionmaking regarding the proposed action." This is because a description of the current state of the environment inherently includes effects of past actions. Guidance further states that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historic details of individual past actions."

The cumulative effects of the BLM timber management program as a whole in western Oregon have been described and analyzed in the Roseburg District PRMP/EIS and the FSEIS for the Northwest Forest Plan, incorporated herein by reference.

I. Timber Resources

A. Alternative One – No Action

There would be no regeneration harvest at this time in Section 25, T. 29 S., R. 3 W., or in Sections 3 and 4, T. 30 S., R. 4 W. As discussed on page 5, this would not constitute a reallocation of the lands to non-commodity uses. The forest stands are in the General Forest Management Area land use allocation where the majority of timber harvest is scheduled to occur. Future harvest would not be precluded and could be analyzed in a subsequent EA.

On forest lands managed for commodity timber production across the Roseburg District, the ROD/RMP (p. 8) anticipated that regeneration harvest would be conducted at an average annual rate of 1,190 acres. As illustrated in Table 16 of the 2006 *Roseburg Annual Program Summary and Monitoring Report* (USDI, BLM 2007b p. 34), from Fiscal Year 1995 through Fiscal Year 2006, only 3,845 acres of regeneration harvest were authorized. This represents only 27 percent of the 11,900 acres of regeneration harvest anticipated in the first decade following implementation of the ROD/RMP (p. 8).

Fewer than 1,200 acres of the regeneration harvest authorized has actually been harvested. This represents approximately eight percent of what would have been expected over the period of the past13 years. Because regeneration harvest has been conducted at levels far less than anticipated there has been an overall trend toward an older forest age-class distribution than was envisioned in the PRMP/EIS (Chapter 4-27&28). This trend is expected to continue for the foreseeable future.

This alternative would not meet the ROD/RMP objectives for regeneration harvest described on page 2 of this assessment that include: regeneration harvest in the General Forest Management Area in forest stands beyond culmination of mean annual increment; providing an annual allowable sale quantity of 45 million board feet; and providing long-term timber supplies consistent with management direction and sustained yield assumptions of the ROD/RMP. It would not comply with Section 1 of the O&C Act which stipulates that the revested O & C Lands be managed "… for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities…"

As these stands, already past culmination of mean annual increment, continue to age gaps will form in the forest canopy as individual trees or small groups of trees die. These gaps would be reoccupied by overstory and understory trees. Over time, some of these understory trees would die from suppression. Absent the periodic occurrence of low intensity fires, the accumulation of branches, needles, and dead and suppressed trees would result in fuel loads exceeding historic levels, posing an increasing risk of fire (Oliver and Larson 1996).

Under this alternative, the BLM would not conduct commercial thinning and density management in the Matrix stands described in this assessment. The stands would continue to develop as relatively homogeneous and even-aged stands, primarily single-storied and dominated by Douglas-fir. Forest canopies would remain fully closed and tree diameter growth and crown expansion would continue to decline from competition among trees for water, nutrients, and sunlight. Height growth, which is less affected by stand density, would continue, but with little corresponding increase in diameter, trees would become unstable and more susceptible to wind damage (Wonn 2001, Wilson and Oliver 2000).

The percentage of live crown in individual trees is projected to recede below 30 percent over the next 10 to 20 years, as lower limbs are shaded out and die. Reduced diameter growth rates would leave trees less capable of adapting to, and surviving disturbances, such as wind, wildfire, insects and diseases. Suppression mortality and potential stagnation of tree growth would increase as live crowns recede.

The snags and large down wood generated by suppression mortality would come from the smaller trees diameter classes. Hardwoods trees and shade intolerant conifers such as sugar pine and ponderosa pine would be gradually eliminated from the stands, and the establishment and growth of woody shrubs and herbaceous plants in the forest understory would be largely precluded. Development of species richness and diversity would be delayed until a disturbance occurred sufficient to alter the stand developmental pathways.

Reduced tree vigor also results in slower-growing trees and a greater susceptibility to damage and mortality from insects and diseases. *Armillaria ostoyae* in stands will continue to spread due to the preponderance of highly susceptible Douglas-fir, and low tree vigor which reduces resistance to the root disease. *Phellinus weirii* is expected to remain at endemic levels and both diseases would continue to provide small-scale gaps in the forest canopy.

This alternative would not meet the resource objectives for the General Forest Management Area and Connectivity/Diversity Block land use allocations described on page 3 of this assessment because it would not: provide a high level of quality wood and sustainable timber production from the General Forest Management Area; and moderately high levels of timber production from the Connectivity/Diversity Blocks; maintain stand health and vigor; and recover the commodity value of trees that would be lost to suppression mortality.

It would not meet the resource objectives for Riparian Reserves because it would not: retain hardwoods as stand components; diversify the species and structural composition of riparian stands; and accelerate the growth of the remaining trees to provide short and long-term sources of large wood for instream recruitment.

There would be no density management in Late-Successional Reserve stands identified in this assessment.

Old-growth stands typically developed at low tree densities, while these young managed stands are developing at comparatively higher densities (Tappeiner et al. 1997). Without silvicultural treatment or natural disturbances, stand growth would likely stagnate resulting in stands with little structural complexity, as described above. This would be indicated by lack of large overstory trees, a decrease in species diversity as hardwoods and shade intolerant conifers die from suppression, and canopy conditions that are closed and single-layered. Available sunlight reaching the forest floor would be low and generally insufficient to support establishment and survival of understory vegetation.

The formation of canopy gaps and stratification of the canopy into multiple layers would generally not occur in the majority of stands, excepting for those in which root diseases have been noted.

The growth and development of large diameter trees would be delayed creating a deficit of large snags and down wood which would need to be created by disturbance factors other than suppression mortality, such as windthrow, root disease, lightning or fire.

Recruitment of snags and coarse woody debris would occur primarily from suppression mortality. This would generally be from smaller diameter trees, and would not persist over time.

Table 4-1, contained in the discussion for Alternative Two, models the effects of No Action against those of the Proposed Action. Under this alternative, approximately 24 percent of the trees presently occupying the stand would succumb to suppression mortality over the next 20 years absent density management, resulting in a substantial increase in the accumulation of dead fuel on the forest floor.

This alternative would not meet the resource management objectives for Late-Successional Reserves described on page 3 because it would not: promote development of old-growth forest characteristics; maintain stand health and vigor, and promote the growth of the remaining trees; retain hardwoods as stand components; maintain native species diversity and structural composition of the forest stands; maintain and improve late-successional habitat connections within and between LSRs; create larger blocks of interior late-successional habitat; and decrease the risk of large scale disturbance from fire, wind, insects, and diseases that would destroy or limit the ability of the reserves to sustain viable species populations.

On private forest lands throughout the watershed, it is assumed that timber harvest would continue at a rate comparable to what has been witnessed over the past decade, and that new stands would be managed on a commercially viable rotation of 50 years or less, regardless of actions taken or not taken by the BLM in management of timber lands under its control.

As described on page 19, the condition of private lands was assessed in 2000. Of the acres of forest land under private ownership and management, 13 percent was early-seral forest less than 30 years old, 57 percent was mid-seral forest between 30 and 80 years old, and the remaining three percent was late-seral forest greater than 80 years of age.

In 2003, an analysis of clearcut harvest on private lands was conducted using a geographic information system analysis of 2003 orthophotos to map recent harvests. This approach was adopted because it represents the most accurate methodology that is reasonably available for characterizing and describing these past actions. It was calculated that from 1993 to 2003, approximately 1,392 acres of forest stands age 31-80 years were harvested on private lands. In stands greater than 81 years old, 839 acres were harvested on private lands. Together, this represented harvest of one and one-quarter percent of all forested acres in the watershed.

The Bland Mountain #2 Fire, in August of 2004, burned approximately 4,500 acres. One-third of the acres burned are managed by the BLM. The distribution of acres affected was predominantly less than 30 years of age. About 20 acres 50-80 years old and 106 acres over 80 years old suffered extensive fire mortality. Approximately 146 acres of the 3,000 acres burned on private lands were over 30 years of age and the balance less than 30 years of age. Across all ownership, the fire reduced acres in the 30-80 and 80+ age classes by a fraction of one percent in each case.

Assuming a continuation of the estimated level of harvest from private lands between 1993 and 2003, approximately 650 acres of mid-seral forest would have been harvested along with 420 acres of late-seral forest over the past five years. In the meantime, the BLM has planned and/or authorized 407 acres of regeneration harvest in the watershed. If it is assumed that the BLM acres had been harvested, the present age class distribution for all ownerships would be approximately 38.5 percent early-seral forest, 23.5 percent mid-seral forest and 38 percent late-seral forest. In excess of 55 percent of forest lands managed by the BLM would remain as late-seral forest, representing more than 90 percent of the late-seral forest in the watershed.

Scattered salvage of timber blown down along roadsides and the removal of timber associated with road construction under reciprocal rights-of-way agreements is anticipated, but cannot be accurately predicted and quantified.

One other Federal action that may also reduce late-seral forest is the proposed Williams Connector Pipeline. If authorized and constructed, the right-of-way would remove approximately 43 acres of late-seral forest, 8 acres of mid-seral forest and 21 acres of early-seral forest which would be managed for the foreseeable future in non-forest or early-seral forest condition. This would constitute a change of less than 0.25 percent in the amount of late-seral forest and 0.13 percent of all forest managed by the BLM in this watershed.

B. Alternative Two – The Proposed Action

Following the proposed regeneration harvest, the units would be prepared for replanting by broadcast burning, or hand piling and burning. This would facilitate reforestation with seedlings grown from seed collected from trees adapted to local environmental and climate conditions. Burning would also aid in control of competing vegetation while the new trees become established. As the stands develop, intensive site management in the form of brushing, precommercial thinning, pruning, and commercial thinning would follow. This would meet ROD/RMP objectives of harvesting stands beyond culmination of mean annual increment, offering an annual sale quantity, and providing a sustainable future timber supply.

Commercial thinning and density management in the Matrix allocations would meet the objective of assuring high levels of timber productivity and quality wood production by increasing average stand diameter growth. Increased rates of growth would be expected to last for 15 to 20 years, until forest canopies approach closure again. Selecting the best formed co-dominant and dominant trees for retention, and promoting live crown expansion and diameter growth by releasing these trees from competition would aid in maintenance of stand health and vigor, and increase resistance to disturbances such as wind, disease, insect attack, and wildfire.

Variable density thinning in the Connectivity/Diversity Block and Riparian Reserve land use allocations would create gaps and areas of greater canopy removal, allowing sufficient light for regeneration of more shade tolerant conifers, retention of hardwood species, and establishment of shrub and forbes communities on the forest floor. The lower stand densities in Riparian Reserves would accomplish these same objectives and allow for accelerated tree growth that would provide larger wood for future instream recruitment.

In the Late-Successional Reserves, light and moderate variable density thinning from below would remove smaller trees that that would normally die from suppression. This would limit recruitment of smaller diameter snags and down wood for the short term and reduce the overall numbers of trees available for snag recruitment and down wood over the longer term. The smaller diameter snags and down wood created by suppression mortality would not persist for the long term, however. Physical damage to existing down wood would also occur from felling and yarding operations.

In the short term, additional coarse woody debris and snags would be generated by: continuing suppression mortality in unthinned areas; non-merchantable wood left in the units following density management operations; mechanical damage to reserve trees, such as broken out tops; snow break and windfall; and snags felled for safety reasons.

Over time, trees in treated areas of the stands would grow to larger diameters than trees in the untreated areas. The treated areas would eventually reach a level of stand density and canopy closure where mortality suppression would once again occur. This would result in snags and down wood of larger size, which would persist for longer periods of time. In light and moderately thinned areas the recommended five snags per acre larger than 20 inches diameter breast height would be achieved 10-20 years sooner than in areas not thinned.

Retention and release of hardwoods and minor conifer species, in conjunction with the protection of advanced regeneration in unthinned areas would contribute to development of multiple canopy layers, and species diversity. Canopy gaps created by endemic root disease would continue to contribute small-scale structural diversity in stands.

Table 4-1 compares stand conditions under the two alternatives for three time periods (years 2008, 2028, and 2118). The table does not display or account for any future silvicultural prescriptions which could be applied to maintain and promote growth of a variety of conifers and hardwoods species.

Table 4-1 Comparison of the Effects of the Alternatives on a Late-Successional Reserve Stand from current conditions to 20 and 110 years into the future

Stand Treatment	Age	Trees per Acre	Basal Area (square feet per acre)	Quadratic Mean Diameter (inches)	Relative Density
Alternative One	Stand Age 41 yrs.	325	230	11.4	76
Alternative Two		131	130	13.5	40
Alternative One	Stand Age 61yrs.	247	283	14.5	85
Alternative Two		125	199	17.1	56
Alternative One	Stand Age 151 yrs.	131	408	23.9	100
Alternative Two		97	360	26.1	85

*Trees per acre includes only overstory trees initially on the site in 2008,.and does not account for in-growth. A higher degree of in-growth would be expected in areas thinned to lower residual relative densities.

Cumulatively, the proposed regeneration harvest of 236 acres would reduce late-seral forest on BLM-managed lands within the watershed by approximately 0.7 percent.

II. Wildlife

A. Alternative One – No Action

There would be no direct effects to wildlife inhabiting BLM-managed lands. Habitat conditions would remain generally unchanged at the unit scale in the short term unless a major disturbance such as fire, wind, ice, insects, or disease occurred. Absent any such disturbance, the primary influence on long-term habitat development would be the growth and mortality of overstory trees, as discussed below.

Future habitat conditions in late-seral stands would most likely be affected by mortality of individual trees or small groups of trees in the overstory, which would become snags that would eventually fall to the forest floor and become large down wood. As large snags or live trees fall, they would create openings by limbing or knocking over adjacent trees, increasing light levels and releasing understory conifers and hardwoods, allowing them to grow into intermediate canopy positions and possible canopy dominance over time. Canopy openings would also allow establishment and growth of some shrubs and herbaceous vegetation.

The overall effect of these successional processes would be the creation of a mosaic of tree ages, species composition, and late-seral habitat features in the stands that would continue to support species dependent on late-seral habitat characteristics, while also providing interspersed patches of habitat suitable for species dependent on early- or mid-seral forest.

Over the long term, conditions in mid-seral stands would be most affected by competition and suppression mortality. Overstocked conditions would result in relatively slow growth rates that would prolong crown differentiation. Eventually some trees would become dominant and shade out suppressed trees. Suppressed trees would die and stand as small-diameter snags until they ultimately fall, but because of their smaller size, they would not create openings as are found in late-seral stands. Crowns of adjoining dominant trees would soon expand into the newly-available growing space, limiting establishment of understory vegetation in response to the disturbance. Multiple waves of such competition mortality would be necessary before dominant tree density would be low enough for understory reinitiation. This growth trajectory would be unfavorable to the development of mature and late-successional forest attributes, particularly large-diameter trees, high crown volume, large branches, cavities, large snags, and large down wood.

Blowdown of small patches in mid-seral stands would be another, less important source of disturbance. Trees infected with root diseases, in areas of soil instability, or with poor tree height-to-diameter ratios would be susceptible to blowdown. An increase in available light resulting from the creation of these patches would stimulate the growth of adjacent trees, as well as shrubs and herbaceous vegetation.

The availability of late-successional forest habitat is the primary wildlife concern in the South Umpqua River fifth-field watershed because of the effects of past and expected future timber harvest. Forest stands in the watershed begin functioning as late-successional habitat at approximately 80 years old, when characteristics like large diameter trees, a secondary canopy layer, snags, and cavities have developed.

Approximately 80,626 acres (57 percent) in the watershed are privately-owned. In 2000, approximately 1,904 acres of the 62,623 acres of privately-owned forest lands were late seral stands at least 80 years old. The amount of late-seral habitat on private land in the watershed is expected to continue to decline and become effectively non-existent in the next few decades as these lands are managed on a commercially viable rotation of 50 years or less.

Early and mid-seral habitat is expected to be abundant on both BLM-managed and private land as a result of past and future timber harvest. However, the development and maintenance of ecologically useful early and mid-seral stands in areas of recent timber harvest is a concern.

This is particularly true on privately-managed forest lands, where densely-stocked Douglas-fir monoculture is often the objective. Few large trees, if any, remain after harvest and deciduous and minor conifer species are largely targeted for elimination through herbicide treatment and thinning. These stands are not expected to provide high levels of habitat for wildlife species that use attributes like herbaceous understory vegetation, shrub or mid-story layers, or large residual trees and snags.

Populations of wildlife species associated with late-seral habitat are expected to increase because of the expected increase in late-seral habitat on BLM-managed land in the watershed. Habitat quality, however, is expected to be less than ideal in stands where large snags and down wood are lacking and past use of intensive silvicultural practices favored establishment and growth of nearly pure stands of Douglas-fir at the expense of species diversity.

In the absence of natural disturbance, then, forest age classes in the watershed will likely trend towards the extremes: structurally simple stands with low plant species diversity on private land and late-seral stands on BLM-managed lands, with fewer acres of high-quality early- and mid-seral stands.

No other BLM timber management projects in the South Umpqua River fifth-field watershed are considered reasonably foreseeable over the next five to ten years as all stands currently considered viable for commercial thinning and density management were evaluated for this assessment, and no other regeneration harvest is proposed for the watershed at this time.

Construction of the Williams Connector Pipeline through the watershed is a reasonably foreseeable non-discretionary action that would affect wildlife habitat on BLM-managed lands. Approximately 43 acres of late-seral habitat, 8 acres of mid-seral habitat, and 21 acres of early-seral habitat would be removed on BLM lands; subsequent maintenance of the pipeline would maintain early-seral conditions in the affected area.

B. Alternative Two – The Proposed Action

A. Special Status Species

Threatened and Endangered Species

The proposed regeneration harvest would render approximately 236 acres of forest stands unsuitable as **northern spotted owl** nesting, roosting and foraging habitat. Harvest would remove most overstory trees, large snags, canopy layers, canopy cover and structural complexity. The areas would be unsuitable as dispersal habitat for approximately 40 years, until canopies of the replacement stands close sufficiently to provide cover. Development of the structural characteristics of nesting, roosting, and foraging habitat would take approximately 80 to 100 years.

No direct effects to spotted owls would be expected due to removal of suitable habitat. Harvest within 0.25 miles of known spotted owl sites, the Known Owl Activity Center, or unsurveyed suitable habitat would be seasonally restricted from March 1 to September 30, ensuring that pre-dispersal spotted owl fledglings or attendant adults would not be affected through habitat modification. This seasonal restriction may be waived until March 1 of the following year if surveys indicate spotted owls are not present, not nesting, or failed in a nesting attempt.

Three home ranges would be affected by the proposed regeneration harvest. Harvest would remove approximately 80 acres of suitable habitat, but none from within core areas. Habitat removal would have indirect effects. While spotted owls can survive and/or remain productive in areas with varying levels of available suitable habitat, at some threshold a home range would cease to be viable.

Based on previous research, 50 percent suitable habitat in a core area and 40 percent suitable habitat across an entire home range is considered a conservative viability threshold for a reproductive spotted owl pair ("50/40 threshold", USDI, USFWS 2007a). The proposed harvest would not reduce available suitable habitat below the 50/40 threshold in the Coffee Forks and Decaf home ranges, and their use by spotted owls would be expected to remain unchanged.

The Stinger Gulch home range suitable habitat is already below the viability 50/40 threshold and would be reduced further. Spotted owls may reasonably be expected to cease using this home range and attempt to re-establish themselves elsewhere, or suffer mortality from starvation, predation, or exposure in attempting to relocate elsewhere. This effect would be consistent with assumptions of the Northwest Forest Plan.

At the scale of the South Umpqua River fifth-field watershed, availability of suitable nesting, roosting and foraging habitat would remain generally constant because in-growth and maturation of mid-seral forest on BLM-managed lands, in conjunction with projected levels of regeneration harvest over the next 25 years would generally maintain the levels of suitable nesting, roosting and foraging habitat (SUWA, p. 85).

Over the long term, defined as 100 years by the ROD/RMP (p. 106), the amount of late-seral forest on the Roseburg District is projected to increase by 51 percent(PRMP/EIS, Chapter 4 - 29), which would provide an additional 131,000 acres of nesting, roosting and foraging habitat for the northern spotted owl (PRMP/EIS, Chapter 4 - 57).

The BLM, U.S. Forest Service, and U.S. Fish and Wildlife Service conducted a coordinated review of four recent reports on the northern spotted owl. These were the Scientific Evaluation of the Status of the Northern Spotted Owl (Courtney et al. 2004), Status and Trends in Demography of Northern Spotted Owls, 1985-2003 (Anthony et al. 2004), Northern Spotted Owl Five Year Review: Summary and Evaluation (USDI, USFWS 2004b), and Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft (USDA and USDI. 2005. Joe Lint: Technical Coordinator).

The review (see *Appendix B* – Wildlife) found northern spotted owl populations have continued to decline in the northern portion of the species range, despite a high proportion of protected habitat on federal lands in that area. Courtney et al. (2004) indicated that population declines over the past 14 years were expected, and concluded that the accelerating downward population trends on some study areas in Washington where little timber harvest has occurred suggests something else is responsible.

In southern Oregon and northern California, northern spotted owl populations have proven to be more stable than in Washington (Anthony et al. 2004). This was not expected within the first ten years, given a general prediction of continued population declines over the first several decades of Northwest Forest Plan implementation (Lint 2005). The cause of better demographic performance on the southern Oregon and northern California study areas, and greater than expected declines on the Washington study areas are both unknown (Anthony et al. 2004). Courtney et al. (2004) noted that a range-wide population decline was not unexpected during the first decade, nor was it a reason to doubt the effectiveness of the core Northwest Forest Plan conservation strategy.

Anthony et al. (2004) stated that determining the cause of this decline was beyond the scope of their study. They could only speculate among numerous possibilities, including competition from barred owls, loss of habitat to wildfire, timber harvest including lag effects from prior harvest, poor weather conditions, and defoliation from insect infestations. Considering the fact that the northern spotted owl is a predator species Anthony et al. (2004) also noted the complexities of relationships of prey abundance on predator populations, and identified declines in prey abundance as another possible reason for declines in apparent survival of northern spotted owls.

Anthony et al. (2004) indicated that there is some evidence that barred owls may have had a negative effect on northern spotted owl survival in the northern portion of the northern spotted owl range, but found little evidence for such effects in Oregon or California. Barred owl competition has not yet been systematically studied to determine whether it is a cause or a symptom of northern spotted owl population declines, researchers indicate a need to further examine threats from barred owl competition.

The results of ongoing studies of these interspecies interactions have yet to be published. Independent review of the Draft Spotted Owl Recovery Plan (Courtney et al. 2008) reiterated the relationship between barred owl expansion and spotted owl decline was not well understood, but a definite correlation exists. Concern is high enough, however, that barred owl removal has been proposed as part of the most recent spotted owl recovery plan (USDI, USFWS 2008).

Some researchers have hypothesized that regeneration harvest has facilitated barred owl range expansion (Root and Weckstein 1994, Dark et al. 1998, Konig et al. 1999), but definitive evidence is lacking. Barred owls can use many types of forested habitats, and given the land ownership pattern, fragmented habitat, and existing barred owl presence in the area it is unlikely that the proposed timber harvest would have any notable effect on barred owl expansion.

Spotted owl prey species would also be affected by the proposed regeneration harvest. Many species such as brush rabbits, woodrats, and other rodents are primarily associated with early-and mid-seral forest habitat (Maser et al. 1981, Sakai and Noon 1993, Carey et al. 1999) and would likely benefit from the creation of early-seral forest conditions providing a greater abundance of forage. These prey could become available to spotted owls if they move into spotted owl habitat.

Habitat for the Oregon red tree vole and northern flying squirrel would be removed, but it is not expected that this would extirpate these species from the watershed for the following reasons. As previously discussed, the level of late-seral habitat in the watershed provided by BLM-managed lands will remain abundant and generally constant in the near term, while gradually increasing over the long term. Also, both these species are also known to inhabit and forage in mid-seral stands (Maser 1966, Corn and Bury 1986, Carey 1991, Gomez 1992) which are abundant in the watershed. It is not known, however, if such stands are population sources or sinks.

Based on the above information, the proposed regeneration harvest would affect spotted owls through habitat removal, which would likely render one home range unsuitable for a reproductive owl pair. While these effects would harm individual spotted owls, they will not exceed those anticipated by the Northwest Forest Plan.

Given the current state of knowledge on barred/spotted owl competition and the projected future amounts of suitable habitat in the watershed, there is no basis for concluding that the proposed regeneration harvest would create circumstances that would result in spotted owls being displaced from the watershed by barred owls.

Commercial thinning and density management would be applied to approximately 805 acres of unsuitable and dispersal-only habitat located within 25 spotted owl home ranges (Table 4-1). Eleven of these home ranges overlap LSR RO223. Within these home ranges, approximately 96 acres or 20 percent of the 448 acres proposed for density management would be left as unthinned patches.

Table 4-2 Acres harvested in spotted owl home ranges and levels of suitable habitat in core area and home ranges before and after harvest.*

Site	Acres Harvested in Home Range		Percent Suitable Habitat, Pre-Harvest		Percent Suitable Habitat, Post-Harvest	
	CT/DM	Regeneration Harvest	Core	Home Range	Core	Home Range
ASH CREEK	147		54%	18%	54%	18%
AZALEA PEAK	27		8%	23%	8%	23%
BEAR PAW	73		38%	39%	38%	39%
BLAND BAILEY	21		26%	11%	26%	11%
COFFEE CREEK	72		82%	73%	82%	73%
COFFEE FORKS	33	54	60%	45%	60%	43%
CORN CREEK NORTH	11		39%	29%	39%	29%
DAYBREAK	40		46%	21%	46%	21%
DAYGLOW	15		28%	16%	28%	16%
DECAF		12	77%	80%	77%	80%
GRANITE CREEK	6		51%	37%	51%	37%
GRATEFUL DEAD	108		70%	53%	70%	53%
HYDE RIDGE	148		34%	21%	34%	21%
LOWER DAYS	37		24%	28%	24%	28%
MEL KAT	14		31%	18%	31%	18%
MILLER MINES	23		37%	27%	37%	27%
OSHEA CORNERS	77		23%	27%	23%	27%
OSHEA CREEK	25		41%	36%	41%	36%
RONDEAU BUTTE	47		14%	9%	14%	9%
SHIVELY FORKS	22		37%	15%	37%	15%
SLIMER	203		4%	14%	4%	14%
ST JOHNS CREEK	136		39%	29%	39%	29%
STINGER GULCH		25	33%	21%	33%	20%
SWEAT CREEK	237		26%	20%	26%	20%
TATER HILL	86		80%	63%	80%	63%
TURKEY CREEK	29		32%	35%	32%	35%
UMPCOW	30		27%	28%	27%	28%
UPPER DAYS CREEK	123		69%	55%	69%	55%
UPPER MAYS CREEK	34		51%	17%	51%	17%

* Acres are double-counted when they occur in multiple home ranges.

Removal of suppressed and intermediate canopy layers and limited removal of some co-dominant and dominant trees would result in reduced canopy closure and variable stand densities that would reduce vertical and horizontal cover. Spotted owls would be expected to continue to use these stands, however, because post-project canopy cover would exceed 40 percent and the quadratic mean diameter of the stands would exceed 11 inches diameter breast height, figures widely used as a threshold for dispersal function (Thomas et al. 1990).

Use of thinned stands would likely be less than unthinned stands, however, until canopy cover returns to pre-treatment levels in 15-20 years. Density management in Riparian Reserves and Late-Successional Reserve would accelerate development of late-successional habitat features used by both spotted owls and their prey.

Proposed density management units are generally at the periphery of the affected home ranges and would not limit access to suitable habitat for most affected sites (Figure B-1, *Appendix B – Wildlife*). Unit, 30-4-33A is located between the Sweat Creek owl site and 180 acres of suitable habitat to the east, as well as between the Slimer site and 246 acres of suitable habitat to the west. Treatment would not block access to these areas because the interposed portion of the unit would be unthinned or lightly thinned and not expected to affect use of suitable habitat at the home range scale.

The U.S. Fish and Wildlife Service has determined that thinning within 200 meters of a spotted owl site will likely result in take (USDI, USFWS 2007a). Additional studies suggest that the effects of thinning may extend greater distances, and further guidance from the U.S. Fish and Wildlife Service is expected in the near future. Consequently, approximately 48 acres in the northern portion of Unit 30-4-33A would be left unthinned to potential adverse effects to the Slimer owl site.

No effect from noise disruption would be expected because all activities would meet minimum disruption threshold distances, as previously identified in consultation with the U.S. Fish and Wildlife Service. Activities within the minimum threshold distances[6] of known spotted owl sites, unsurveyed suitable habitat, or Known Owl Activity Centers would be seasonally restricted to ensure noise disruption would not cause nest abandonment or premature fledging.

Five proposed commercial thinning units are in Critical Habitat Unit OR-29, and nine proposed density management units are in Critical Habitat Unit OR-32. In past consultation, the U.S. Fish and Wildlife Service has found that with retention of 40-60 percent canopy closure post-treatment and adequate adjacent dispersal habitat there is not likely to be any measurable effect to dispersing owls, and density management is not likely to adversely affect the function of critical habitat.

Five of the spotted owl home ranges that would be affected by the proposed South Umpqua River Watershed Harvest Plan could also be affected by another reasonably foreseeable action located in the adjacent Middle South Umpqua/Dumont Creek fifth-field watershed.

[6] chainsaw: 65 yards, heavy equipment: 35 yards, helicopter: 120 yards

This proposed commercial thinning project would potentially affect an estimated 45 acres in the Tater Hill home range, 99 acres in the Grateful Dead home range, 38 acres in the Coffee Creek home range, 68 acres in the Decaf home range, and 157 acres in the Rondeau Butte home range. These managed, mid-seral conifer stands would be treated in a manner similar to the proposed commercial thinning and density management being analyzed in this assessment.

Bureau Sensitive Species

No direct effects to **bald eagles** would be expected from the proposed timber management action, because if nesting bald eagles are found in or near proposed regeneration harvest Units 30-4-3A, 30-4-3B, and 30-4-4A, management direction from the ROD/RMP (p. 49) and conservation measures from the National Bald Eagle Management Guidelines (USDI, USFWS 2007b) would be applied to assure that nesting habitat is protected and disturbance to nesting eagles is avoided.

Removal of suitable habitat in Units 30-4-3A, 30-4-3B, and 30-4-4A would indirectly affect to bald eagles by reducing future nesting opportunities. This effect would not be expected to contribute to the need to re-list the bald eagle under the Endangered Species Act, however, as the U.S. Fish and Wildlife Service considered the effects of planned management actions on Federal lands, including timber harvest, when delisting the species in 2007.

Where it occurs, suitable habitat for **Chace sideband, Oregon shoulderband and Crater Lake tightcoil snails** would be surveyed using an accepted protocol (Duncan et al 2003). Analysis of the number of sites found and available habitat in the project area would determine management strategy. If necessary, site protection may include altering unit configurations, designating buffers, or implementing other measures to provide suitable microclimate, undisturbed substrate, and vegetation or down wood to ensure that viable populations would remain in the occupied stands. Consequently, it would not be expected that the proposed timber management plan would contribute to the need to list these species under the Endangered Species Act. The proposed commercial thinning and density management could indirectly benefit these species by accelerating development of large woody debris and herbaceous vegetation.

Townsend's big-eared bats, Pacific pallid bats, and fringed myotis all are known to utilize caves, mines, or rock outcrops for roosts, maternity colonies, or hibernacula. None of these potential habitats exist in the proposed regeneration harvest units. The three species are known to forage in coniferous forest stands and use large trees and snags for roosting. Large trees and snags are common throughout the proposed regeneration harvest units.

A lack of detailed information on bat populations in the South River Resource Area in general, and specifically in the areas in which regeneration harvest is proposed, make potential effects difficult to quantify. Bats are capable of traveling widely and quickly, so individuals residing in the proposed harvest units would likely move to other areas.

Direct mortality of individuals that may occupy the stands is a possibility, however, and displacement of could indirectly result in mortality due to increased competition for roost sites and foraging areas. It is unlikely that the proposed regeneration harvest would contribute to a need to list these bat species under the Endangered Species Act, however, for the following reasons.

- No caves, mines, or rock outcrops would be affected;
- Retention trees in regeneration harvest units and large trees and snags in Riparian Reserves continue to provide a degree of roosting opportunities after harvest;
- All three species have been observed foraging in open areas and/or riparian zones (Cross and Waldien 1995, Marshall et al. 1996, Verts and Carraway 1998, Pierson et al. 1999, Fellers and Pierson 2002), which the proposed regeneration harvest would create and/or protect;
- Amounts of late-seral habitat on BLM-managed lands in the watershed are not expected to change appreciably by the year 2025 (SUWA, p. 85) and are expected to increase over the next 100 years. So although they may change spatially and temporally, comparable roosting and foraging opportunities will be available in the watershed.

Abandoned mine workings are present in proposed Late-Successional Reserve density management Unit 31-4-21A, which will be surveyed for bat occupancy. If bats are detected, species identification will be attempted using acoustic or capture methods, and if any target species are detected, unit configuration and/or project timing would be altered to ensure that no take occurs.

In the proposed commercial thinning and density management units, large remnant trees which could be used for roosting would be reserved from harvest, subject to safety and operational exceptions previously described. Consequently, the proposed timber management plan would not be expected to contribute to a need to list any of these species under the Endangered Species Act. Thinning and density management may indirectly benefit these species by accelerating growth and development of large trees and future snags suitable for roosting, and by favoring insect populations through development of herbaceous and shrub vegetation.

Potential **harlequin duck** nesting habitat adjacent to a 1.4 mile reach of Days Creek that runs between proposed commercial thinning Units 29-3-27A, B, and C is marginal. The stream channel is narrow, lacks large boulders for loafing sites, and is subject to ongoing disturbance from a parallel road accessible to the public and used for private timber hauling. Nevertheless, it is possible that the species could choose the area for nesting. No effects to potential nesting habitat would be expected because of the establishment of "no-harvest" buffers at least 50 feet (~15 meters) in width along this fish-bearing stream.

Disturbance would be a concern along portions of proposed Unit 29-3-27A where operations could during nesting season. However, the potential for disturbance to nesting harlequin ducks along this short segment of marginal habitat is low enough that it would not contribute to the need to list the species under the ESA.

Although **purple martins** typically nest in more open habitat (Brown 1997, Horvath 2003), it is possible that suitable nest trees and/or snags, on the periphery of the proposed regeneration harvest units or in openings within the stands, could be cut reducing nesting opportunities. The likelihood of loss of nest trees would be low, however.

Given the abundance of potential habitat in previously harvested units in the watershed and creation of 236 acres of early-seral habitat with snags and large remnant trees, which would provide 20-40 years of suitable nesting habitat for purple martins, the loss of some habitat components in the proposed regeneration harvest areas would not be expected to permanently affect purple martin populations on the Roseburg District or contribute to the need to list the species under the Endangered Species Act.

The proposed thinning and density management could affect purple martins by both habitat modification and disturbance. While large green trees suitable for nesting would be reserved from harvest, some suitable nest trees and snags could be felled for safety reasons. Disturbance from operations could occur during purple martin nesting season, resulting in displacement of nesting birds. It is not known if purple martins are using these stands, however, and any effects would be negligible. Considered at the population scale, it is unlikely the proposed action would contribute to a need to list the species.

The proposed regeneration harvest would reduce, by approximately 0.7 percent, the amount of late-seral forest managed by the BLM and by 0.6 percent the total late-seral forest managed in all ownerships in the South Umpqua River fifth-field watershed. Such reductions were envisioned in the first decade following implementation of the ROD/RMP. Because of in-growth and maturation of mid-seral stands, the amount of late-seral forest present on BLM-managed lands in the watershed is not expected to change appreciably by the year 2025, based on the current timber sale plan (SUWA, p. 85), and may even increase slightly based upon levels of regeneration harvest that have been substantially less than envisioned in the ROD/RMP.

While commercial thinning and density management would reduce tree densities, it would not affect overall stand ages. Habitat utility of the project area for some wildlife species may be temporarily reduced by removing canopy cover and horizontal structure. However, sufficient residual tree density, down wood, and snags would remain to provide continued wildlife habitat, and treated stands would regain pre-project cover characteristics within 15-20 years. Consequently, the proposed commercial thinning and density management would not affect availability of late-seral habitat in the watershed, and would contribute to the development of useful mid-seral habitat. Additionally, late seral habitat will be continually developing and increasing on Federal lands in the watershed.

B. Migratory Birds

The Partners In Flight Conservation Strategy for Landbirds in Coniferous Forests of Western Oregon and Washington (Altman 1999) provides a benchmark for evaluating the effects of management actions on focal species and their habitats. As an ecosystem-based approach, the Partners In Flight strategy assumes management actions affecting focal species will also affect other species that use the same habitat types and attributes.

The Partners In Flight strategy identifies habitat and population objectives for focal species, and recommends conservation options to achieve these objectives.

Timber harvest operations could result in the loss of individual birds, nests, eggs and young, depending on the season of operations. The likelihood cannot be quantified, however, and the effects cannot be evaluated against Partners In Flight population goals because detailed population survey information is not available for the Roseburg District.

Effects of timber harvest can be evaluated against habitat objectives and conservation options, however, because many project design features employed in timber harvest are similar to those recommended by Partners In Flight. The extent to which the BLM is able to implement these practices is limited, though, by management direction, and operational and safety requirements.

In regeneration harvest, green trees are designated for retention, with selection typically favoring trees that display habitat structures. Snags are retained where feasible from operational and safety perspectives. Riparian Reserves are established on all intermittent and perennial streams, lakes, natural ponds, springs, and seeps. Large wood is retained in units, post-harvest.

In commercial thinning and density management, a diverse mixture of conifer and deciduous tree species is retained. Large remnant trees that predate the present stands are not the focus of thinning and are retained to the greatest extent practical, as are snags when operational and safety concerns allow. Exiting coarse wood is retained and in Late-Successional Reserves snags and coarse wood are created to meet management objectives.

Timber harvest would have both positive and negative effects on migratory bird habitat. Regeneration harvest would remove most dominant coniferous and deciduous trees, and remove or damage intermediate canopy and understory layers, including shrub layers. It would also result in the loss of trees with nesting structure, and disturb and degrade down wood. This would render the harvested areas unsuitable to species dependent on late-successional habitat. Regeneration harvest would, however, create early-seral habitat with large snags and retention trees, shrubs, herbaceous vegetation, stump-sprouting hardwoods, and young conifers important to other species. Likewise, thinning would remove habitat features like high crown volume and canopy closure, but would accelerate the development of mature and late-successional habitat important to other species.

Regeneration harvest would affect stand-level habitat for **Vaux's swift** by removing most trees suitable for nesting and forest canopy in which the species forages. Normally, it would be expected that 80 years or more would be required for the new stands to develop into habitat suitable for reoccupation. The retention of large green trees and snags would, however, maintain some residual nesting structure that would allow some reoccupation as the replacement stands approach mid-seral stage and develop full canopies. Thinning and density management in stands that currently lack nesting structure would accelerate growth of large trees in mid-seral stands which will provide future nesting habitat.

Regeneration harvest would affect the **brown creeper** by fragmenting forest habitat and removing large trees that provide bark gleaning opportunities. Retention of large green trees, as recommended by the Partners In Flight strategy, would maintain some measure of foraging opportunities as the replacement stands mature and provide more suitable foraging conditions. Thinning and density management in mid-seral stands would accelerate growth of large trees that would provide greater foraging opportunities.

Regeneration harvest would affect the **red crossbill** by removing mature cone-producing trees on which the species forages. Retention of large green trees, as recommended by the Partners In Flight strategy, would maintain some limited foraging opportunities until such time as the replacement stands begin to mature and produce larger and more regular seed crops. Thinning would not be expected to affect foraging by red crossbills, and would improve those opportunities by accelerating the growth of larger trees in mid-seral stands that would produce more abundant cone crops.

Regeneration harvest would remove large trees and snags, and degrade down wood resulting in loss of nesting and foraging habitat for **pileated woodpeckers**. The retention of large green trees, snags where practical, and sound large wood would maintain some residual nesting and foraging structure. This would decrease the amount of time required for the affected stands to regain suitable habitat conditions.

Both regeneration harvest and thinning would remove foraging and nesting opportunities for the **hermit warbler** through overstory removal, in the case of regeneration harvest, or reductions in canopy volume as occurs in thinning. Hermit warblers would be expected to begin utilizing regeneration harvest units when adequate canopy closure is reached in approximately 30 years. The establishment of Riparian Reserves, consistent with recommendations by Partners In Flight, would continue to provide some residual habitat at the stand-scale. Thinning units would reach adequate canopy cover for foraging and nesting in approximately 10-20 years after treatment.

Regeneration harvest would affect the **Pacific-slope flycatcher** by removing most deciduous trees and canopy cover, limiting or eliminating foraging and nesting opportunities. Retention of some hardwoods in commercial thinning and density management units would maintain limited opportunities while providing for development of high-quality habitat over the long term. The establishment of Riparian Reserves is consistent with Partners In Flight recommendations to leave riparian buffers, which may provide for continuity of use by the species.

Nesting and foraging opportunities for **Wilson's warbler** would be reduced by regeneration harvest and thinning through overstory removal, elimination or damage to mid-story trees and shrubs, and reforestation with conifers. Although thinning would temporarily reduce habitat quality, it would accelerate the development of high-quality habitat in the long term. The establishment of Riparian Reserves is consistent with Partners In Flight recommendations to leave riparian buffers, which may provide for continuity of use by the species.

Regeneration harvest, commercial thinning and density management would reduce foraging opportunities for the **winter wren** by decreasing structural complexity near the forest floor as down logs, shrubs, and understory trees are damaged or removed. The species would also be affected by increased forest fragmentation associated with regeneration harvest. Establishment of Riparian Reserves and retention of down wood, consistent with Partners In Flight recommendations, may provide for continuity of use by the species and lessen the period of time over which the habitat redevelops suitability.

Regeneration harvest, commercial thinning and density management would all affect, to varying degrees, the **olive-sided flycatcher** by removing suitable nest trees and foraging/singing perches. Regeneration harvest would create early-seral areas with remnant trees and snags suitable for foraging, as recommended in the Partners In Flight strategy. Thinning would accelerate tree growth and the development of nest trees and foraging/singing perches.

Regeneration harvest would increase foraging opportunities for the **orange-crowned warbler** as deciduous shrubs and trees grow into the harvest units. Conifer re-planting would limit the period of time over which the increased foraging opportunities would persist. Thinning may provide increased foraging opportunities associated with understory establishment and development associated with increased availability of light, but this would only persist for a short period of time before crown closure returns and shrub growth declines.

The creation of early-seral habitat through regeneration harvest would provide increased foraging habitat for the **rufous hummingbird**, as flowering shrubs and herbaceous vegetation become established in the harvested units. Because units would be managed for sustainable timber production they would be replanted to conifers, which would limit the duration of increased forage availability. Thinning would also be expected, to a lesser degree, to stimulate the growth of flowering vegetation on which the species forages.

Regeneration harvest would remove suitable **band-tailed pigeon** nesting habitat. Thinning may indirectly benefit band-tailed pigeons by accelerating the development of suitable nesting habitat.

The **northern goshawk** is a U.S. Fish and Wildlife Service Species of Concern (USDI, USFWS. 2004a). Regeneration harvest would remove suitable habitat and reduce the current and future ability of portions of the project area to support goshawk breeding and occupancy. Thinning would occur in unsuitable habitat and would provide an indirect benefit by accelerating the development of suitable nesting and foraging habitat.

III. Fisheries, Aquatic Habitat and Water Resources

A. Alternative One – No Action

1. Fish Species, Coho Critical Habitat, and Essential Fish Habitat

Under this alternative, there would be no BLM authorized road construction, road renovation, road decommissioning, timber harvest and log hauling. Absent any of these activities, there would be no direct effects to aquatic habitat, anadromous or resident fish, or Essential Fish Habitat adjacent to or downstream of the proposed timber sale areas.

Fish species, including the threatened Oregon Coast coho salmon, and aquatic habitat that includes critical habitat and Essential Fish Habitat for coho salmon would continue to be indirectly affected by existing conditions and activities on private lands within the watershed, as detailed in the following discussion.

2. Aquatic Habitat and Water Quality

Spawning Substrate/Sediment

Absent the proposed timber harvest, there would be no road construction or renovation, or log hauling. Aquatic habitat would continue to be affected, however, by road runoff and sediment generated from BLM and private roads in the watershed that have poor drainage, blocked cross-drains, and inadequate surfacing. These road segments would continue to contribute additional sediment to stream channels which could lead to, over time, impaired spawning substrate and rearing habitat.

Run-off from unsurfaced or poorly surfaced forest roads, particularly those heavily used during periods of wet weather will continue to contribute sediment to streams. Erosion and sediment from roads with inadequate or improperly functioning drainage will have a similar effect. Fine road sediment is generally quickly washed from larger streams (Bilby 1985); however, elevated inputs of sediment are likely to become embedded in stream substrates and impair function as spawning and rearing habitat.

Large Woody Debris

There would be no density management in Riparian Reserves in the Matrix or in riparian management areas in the Late-Successional Reserves. Overstocked stand conditions would continue to retard growth of large conifers and contribute to a trend of continued reduction in the amount large woody debris recruited into stream channels. This would lead to a gradual loss of pool habitat as existing wood decays and is flushed through the stream system which would, in turn, reduce the capacity of streams to store spawning gravel. This trend would continue for several decades until a natural disturbance reduced stand densities sufficiently to allow the growth of larger trees.

Where timber harvest occurs in riparian areas on private lands, losses of existing wood coupled with decreased recruitment of large wood into streams would limit replacement of existing complex pool habitat and creation of new pool habitat.

A natural gas pipeline is proposed to pass through eastern portions of the watershed and would include a number of stream crossings on both private and BLM lands. Trees would be cleared to accommodate a right-of-way approximately 95 ft in total width. Where the pipeline is proposed to cross live streams, including the South Umpqua River, streams would be partially dewatered and trenched, or on smaller streams a tunnel would be bored under the channel to allow installation of the pipeline. Removal of trees adjacent to proposed stream crossings along the right-of-way would locally reduce the potential for streamside recruitment of large woody debris to these streams, and the potential for migration of wood to lower reaches of the watershed.

Pool Quality

Pool quality would remain generally unaffected in the near term. Existing pool habitat in streams adjacent to units would alternately develop and dissipate in the absence of large wood recruitment from adjacent stands. Smaller trees and logs that enter stream channels would provide temporary pool habitat and slow-water refugia, but it would generally not be deep and complex habitat and would not persist for long periods of time as the smaller wood deteriorates and is flushed through. This cycle would persist until trees of large size are available to streams allowing for development of more complex and longer persisting in-stream habitat.

Where timber harvest occurs in riparian areas on private lands, decreased recruitment of large wood into streams would limit replacement of existing complex pool habitat and creation of new pool habitat.

Temperature

Stream temperatures within the South Umpqua River fifth-field watershed are currently affected by reduced streamside vegetation in valley bottom agricultural lands and reduction of riparian canopy closure on privately owned timber lands.

Proposed construction of the pipeline would include a number of stream crossings on both private and BLM lands. Removal of trees would create scattered openings where direct solar heating of streams may occur. Openings at proposed stream crossings would be approximately 95 feet in width and unlikely to have any measurable effect on stream temperatures within the watershed because of the scattered nature and limited size of the openings.

Peak Flows

Transient Snow Zone

Timber harvest on privately owned lands within the Transient Snow Zone of the South Umpqua River fifth-field watershed is likely to occur on an average rotation of 50 years. If concentrated harvest is undertaken on private lands in the same drainages, in the near future, short-term increases in peak flows could occur. Oregon Forest Practices Act regulations on size of harvest units and the spatial scattering of harvest on private lands would largely mitigate these potential effects, however.

The proposed natural gas pipeline construction would remove approximately 190 acres of vegetation, in all private and Federal ownership, within the Transient Snow Zone of the South Umpqua River fifth-field. The risk of peak flow enhancement that would result from this vegetation removal was evaluated using the same model described on page 33 in Chapter Three. Results of the modeling indicate that the risk for peak flow enhancement from rain-on-snow events resulting from the proposed construction is low. Table 4-3 on page 66 compares openings in the Transient Snow Zone predicted under each alternative as well as the threshold for increased risk.

Roads

There would be no change in the length or location of the transportation system managed and maintained by the BLM. Road construction proposed in conjunction with pipeline construction and maintenance would total approximately one mile within the watershed, representing an increase of less than 0.01 percent in the area occupied by roads. This would not be sufficient to contribute to any potential changes in peak flows.

3. Water Rights

Absent any timber harvest on BLM lands, there would be no effect on interception of precipitation or rates of evapotranspiration that could affect the water quality, rate or timing of water delivery to registered water rights downstream of proposed harvest units.

B. Alternative Two – The Proposed Action

1. Fish Species, Coho Salmon Critical Habitat, and Essential Fish Habitat

Direct effects to fish species from timber harvest and log hauling can result from the addition of fine sediment to streams resulting in a temporary increase in turbidity. Fine sediment that becomes embedded in spawning substrate can hinder survival of eggs and alevin still buried in gravel. Turbidity can reduce foraging ability, impair breathing by clogging gill membranes, and increase overall stress levels (Waters 1995).

No direct effects would be expected to any fish species inhabiting streams adjacent to or downstream of any of the proposed timber management units, because of Riparian Reserves and other measures described in the following discussion of effects on aquatic habitat and water quality.

Indirect effects from road construction and renovation, timber hauling and road decommissioning activities could include a reduction in spawning success and egg and alevin survival where fine sediments reach streams and accumulate in gravels. The application of project design features and Best Management Practices described below would minimize the risk for delivery of fine sediment to streams, and any effects would be expected to be short-term and so small as to not be measurable at the project level scale.

As described above, the proposed harvest of timber and associated road construction, renovation, decommissioning and timber hauling could have the effect of generating fine sediment. With the application of Best Management Practices and project design features described below, it is not anticipated these sediments would be measurable at the project level or have any more than short-term effects to critical habitat for coho salmon.

The following components were analyzed to assess the potential effects of the proposed timber management activities on Essential Fish Habitat, with citations to appropriate sections of this assessment.

- *Water quality/Water quantity* – There would be no affect to water quality and or quantity as a result of the proposed regeneration harvest, commercial thinning and density management throughout the watershed. Riparian Reserves on streams in regeneration harvest units, "no-harvest" buffers within Riparian Reserves in commercial thinning units in the Matrix allocations, and "no-harvest" buffers within riparian management areas in density management units in the Late-Successional Reserve would prevent the delivery of sediment to streams and preserve streamside shading essential to the maintenance of water temperatures (Aquatic Habitat and Water Quality, pp. 63-65)
- *Substrate characteristics* – Timber hauling would have a small probability of contributing fine sediment to stream channels, especially at stream crossings. As described on page 31 in Chapter Three, many of the crossings on fish-bearing streams are paved, while others have gravel surfacing in good condition. Road renovation and seasonal restrictions on hauling over roads with surfacing not suited to all-weather hauling would reduce the probability of sediment entering streams. Any affect to substrate as a result of sediment would be negligible and discountable magnitude (Aquatic Habitat and Water Quality, pp. 63-64).
- *Large woody debris within the channel and large woody debris source areas* – There would be no effect on existing in-stream large woody debris as it would be reserved and left on site. Riparian Reserves on streams within or adjacent to proposed regeneration harvest units would retain all mature timber within one to two site potential tree heights for long-term instream recruitment. Thinning and density management in close proximity to streams would not affect short term recruitment of large woody debris. While density management would reduce the number of trees available for future recruitment, the trees that would be removed by density management would principally come from the suppressed and intermediate canopy layers. These smaller diameter trees would not persist over time. By applying density management and releasing the dominant and co-dominant trees in the areas adjacent to streams, accelerated growth would result and provide larger diameter trees for future recruitment as large wood (Aquatic Habitat and Water Quality, pp. 64-65).
- *Channel geometry* – Stream channels are stable and have riparian vegetation sufficient to prevent erosion caused by high stream flow. There would be no measurable increase in peak stream flows that would affect channel geometry (Aquatic Habitat and Water Quality, p. 63).
- *Fish passage* – There would be no effect on fish passage as the proposed timber management plan would not include the construction or replacement of stream crossings on any fish-bearing streams where the potential for creating a barrier to fish passage would exist (Aquatic Habitat and Water Quality, p. 66).

- *Forage species (aquatic and terrestrial invertebrates)* – Forage for coho and Chinook salmon would remain unaffected. Streamside riparian vegetation, protected within Riparian Reserves and "no-harvest" buffers would continue to provide sources of terrestrial invertebrates. Aquatic invertebrate populations would be unaffected by discountable and negligible increases in sediment.

2. Aquatic Habitat and Water Quality

Activities that could affect aquatic habitat conditions could arise from three separate and distinct activities: road construction, renovation and decommissioning; timber harvest; and timber hauling.

Spawning substrate/sediment

Stream substrate is unlikely to be affected by the proposed regeneration harvest, commercial thinning and density management activities proposed by this alternative. Dependent on whether or not a stream is fish-bearing, Riparian Reserves of 160 or 320 feet in width would be established on all streams within or adjacent to the proposed regeneration harvest units. In commercial thinning and density management units, variable width "no-harvest" buffers would be established on all streams as described on pages 9, 10 and 12 in Chapter Two.

Non-compacted forest soils in the Pacific Northwest have very high infiltration capacities and are not effective in transporting sediment overland by rain splash or sheet erosion (Dietrich et. al. 1982). Riparian Reserves and "no-harvest" buffers adjacent to intermittent and perennial headwater streams (less than 3rd order) would be vegetated and non-compacted providing sufficient filtering capacity. Any sediment generated from timber harvesting activities would be intercepted and precipitated by vegetation before it reached any streams.

Intermittent mountain streams, such as are found in the project areas, typically have sufficient storage capacity to retain small amounts of locally generated sediment (Montgomery and Buffington 1997). Most stream reaches also have large woody debris sufficient to trap and store sediment in headwater reaches.

A buffer width of 20 ft or greater would provide root strength sufficient to maintain bank stability (FEMAT 1993), protect eroding banks and prevent additional sediment from entering streams and accumulating in gravel.

New road construction would be located on ridge-top or stable side-slope locations to the greatest extent practicable. Road reconstruction and renovation would be designed to address drainage and surfacing deficiencies in order to reduce sediment generation and transport.

Timber hauling would occur in both the dry and wet seasons. Hauling during dry season would not deliver sediment to stream channels, because absent precipitation, there would be no mechanism for mobilizing fine road sediment and no vector for delivery to nearby streams.

Hauling during the wet season, normally from mid-October and mid-May, can contribute fine sediment to streams where roads cross streams (Waters 1995). As described on page 31 in Chapter Three, many of the crossings on fish-bearing streams are paved, while others have gravel surfacing in good condition.

Renovation of roads to be used for all-weather hauling could include widening, blading and shaping of the road crown and ditches, resurfacing, cleaning of culvert inlets, installation of splash pads at cross-drain outlets, and brushing of the road prism. Additional cross-drains could also be installed to reduce ditch line collection of run-off and re-route it onto the forest floor where it would infiltrate and precipitate any water-borne sediments before they reach live water.

In order to further limit the potential for sediment delivery from roads on the haul route, the following project design criteria would be implemented at the time of operations:

- To the extent practicable, new road construction would be located on stable ridge-tops to prevent sediment delivery to live streams and intermittent channels.
- Temporary roads would be decommissioned during the same season or surfaced and made semi-permanent or permanent for all-weather. This would reduce erosion of road surfaces and delivery of fine sediment to steams.
- Stream crossings that are not paved would be resurfaced with quality aggregate.
- Cross drains would be installed approximately 50 feet from crossings on steep approaches in order to prevent ditch drainage from entering live stream channels.
- Ditch lines would be left vegetated where possible to help filter sediment from road runoff.
- Water bars may be installed as directed to further route water off of road surfaces and onto the forest floor, rather than concentrating delivery at stream crossings.

Large woody debris

Full Riparian Reserves on streams adjacent to or within proposed regeneration harvest units would preserve existing large down wood and the source areas from which more than 90 percent of large in-stream wood is recruited (FEMAT 1993).

Removal of suppressed and intermediate trees adjacent to "no-harvest" buffers could reduce availability of wood for in-stream recruitment in the short term, by reducing the numbers of trees available. Small woody material can create pool habitat in smaller stream systems (Bilby and Ward 1989); however, smaller diameter wood does not persist in the stream channel for the long term due to higher decay rates (Naiman et al. 2002) and is more easily flushed from the system than large pieces (Keim et al. 2002).

Though most woody debris comes from within a site potential tree height from the channel (Naiman et al. 2002), large woody debris can also come from distances exceeding 90 meters in steeply confined channels (Reeves et al. 2003). Fish-bearing streams adjacent to units are only moderately confined and would continue to recruit large woody debris from the riparian corridor. In the long term, as a result of density management, large woody debris recruitment would increase due to the development of larger trees close to the stream channel.

Road construction and renovation would not affect large wood recruitment to streams. Trees removed for ridge-top road construction would be well beyond the distances in which wood recruitment typically occurs. Instances in which trees would be removed for construction of temporary roads over intermittent would be limited to smaller trees in early and mid-seral stands. As previously described, such removal would not be expected to affect large wood recruitment in the long term.

Pool quality

Pool habitat availability would be unaffected by regeneration harvest, commercial thinning and density management. Large woody debris is an important habitat forming component for fish-bearing streams (Keim et al. 2002). All large wood within stream channels and large wood in Riparian Reserves would be reserved for potential in-stream recruitment to form additional pool habitat. Thinning and density management in overstocked upland stands would occur at distances from streams where it would have a negligible effect on the availability of large wood that maintains or enhances pool quality or frequency.

Density management outside of "no-harvest" stream buffers would remove smaller trees but would not reduce the availability of large trees for in-stream recruitment. As noted above, removal of some smaller trees may reduce the amount of pool forming woody debris in the short term, but over a period of decades it would promote the growth of larger conifers which, over time, would enter streams, enhancing existing pool habitat and creating additional pool habitat.

There would be no change in pool availability resulting from road renovation, construction, and decommissioning. Construction of stream crossings would only occur on intermittent streams that do not carry water during the summer months and do not contain pool habitat.

Shade/Temperature

Project design for the proposed regeneration harvest would include Riparian Reserves of 160 feet in width. FEMAT (1993, p V-28) found that "…riparian buffers of 100 feet or more have been reported to provide as much shade as undisturbed late successional/old-growth forests…". The prescribed Riparian Reserves would maintain stream shading necessary to prevent any measurable change to stream temperature.

Density management or commercial thinning adjacent to riparian areas would have the potential to increase stream temperature by temporarily creating openings in the canopy and reducing streamside shade. Shade from trees near the stream channel is important for reducing direct solar radiation and preventing increases in stream temperatures.

Intermittent streams only carry water during winter months when cloud cover and shorter days limit the amount of solar heating. Buffer widths a minimum of 20 feet will preserve streamside trees providing primary shade that, in addition to topographical features of headwater streams, would result in negligible effects to temperatures in these streams.

On perennial fish-bearing streams, buffer widths in excess of 50 feet would continue to provide overhead canopy and stream side vegetation, limiting solar heating and increases in stream temperatures. Consequently, stream shading would not be affected by density management or commercial thinning and it is unlikely that stream temperatures would be affected.

Habitat access

Access to spawning and rearing habitat would be unaffected as there would be no installation or replacement of culverts on fish-bearing streams crossed by roads accessing any of the proposed timber harvest units. New road construction would be located on ridge-top and upland sites wherever practical, and any temporary stream crossings would on intermittent streams that are non fish-bearing.

Peak Flows

Transient Snow Zone

Peak flow increases can occur in forested basins due to the creation of openings in the Transient Snow Zone. These effects primarily occur in areas with less than 30 percent canopy closure (OWEB 1999, IV-11). Commercial thinning and density management is proposed on approximately 696 acres within the South Umpqua River Watershed. Post-treatment canopy closure would remain well above the 30 percent threshold, though, and there would be no expected potential for alteration of snow capture or snow melt, that would give rise to an increased peak flow risk.

Proposed regeneration harvest would create 87 acres of openings within the Transient Snow Zone with the potential to cause localized changes in rates of snow capture and snow melt. These openings would account for less than two tenths of one percent of the total watershed area and would not increase the risk of increased peak flows, already considered low, in the watershed or any of its component subwatersheds.

Table 4-3 Comparison of Openings in the Transient Snow Zone between Alternatives

Subwatershed	Current Condition % TSZ in Openings	Alternative 1 % TSZ in Openings	Alternative 2 % TSZ in Openings	Threshold for Increased Risk
Canyon Creek	4%	4%	4%	55%
Shively Creek	2%	2%	2%	65%
O'Shea Creek	1%	1%	1%	85%
Stouts Creek	3%	4%	4%	55%
Saint John Creek	5%	7%	7%	65%
Days Creek	8%	9%	9%	85%
Coffee Creek	9%	9%	10%	50%
Corn Creek	2%	5%	5%	75%
Summary for South Umpqua Watershed (5th Field HUC)	**4%**	**5%**	**5%**	**65%**

[1] Based on GIS analysis and aerial photo interpretation (GIS data from Healy et. al., 2005).

Roads

The South Umpqua River fifth-field watershed is a Tier 1 Key Watershed. Management direction from the ROD/RMP provides that road densities should be reduced, or at the least should not increase. As described on page 15 of Chapter Two, the BLM and parties to reciprocal rights-of-way agreements have constructed 2.9 miles of permanent road in the watershed since 1995. Over the same period of time, this has been offset by closure or full decommissioning of 7.7 miles of existing road, resulting in a reduction of 4.6 miles of road on BLM-managed lands in the watershed.

The proposed road construction would not extend the drainage network or contribute to potential increases in peak flow due to the location of roads on ridge tops to the greatest extend practical. Road construction would implement project design features and Best Management Practices described on page 64 that are intended to reduce or eliminate current flow routing and prevent new extensions to the drainage network, . Consequently, the roads would be disconnected from the drainage network and would have no potential for affecting peak stream flows.

Upon completion of timber management activities, all temporary and semi-permanent roads would be decommissioned and hydrologically stabilized. The net increase in road miles associated with the timber management plan would be approximately 0.7 miles which would still be 4.1 miles less than at the time the ROD/RMP was implemented.

Peak flows have been shown to increase substantially when roads occupy more than 12 percent of a watershed (OWEB 1999, IV-15). Peak flows would not be measurably affected because after the proposed construction and subsequent decommissioning, less than five percent of the watershed would remain occupied by roads.

Low Flows and Annual Yield

Regeneration harvest has the potential to temporarily increase annual water yield and low flows during summer (Harr et al. 1979) as evapotranspiration is reduced as vegetation is removed. Increases are usually only detectable, however, when a substantial portion of the watershed has been harvested. In a review of 94 catchment experiments, Bosch and Hewlett (1982) found that "reductions in forest cover of less than 20 percent apparently cannot be detected by measuring stream flow."

In instances where sufficient harvest has occurred to increase water yield by measurable levels, several studies have shown that the first storms of fall have the greatest effect on increases in peak flow from pre-logging conditions (Rothacher 1973, Harr et al. 1975, Harr et al. 1979, Ziemer 1981). These fall storms are generally small and geomorphically inconsequential (Harr 1976).

Studies on increased peak flows are varied in their findings on how much increase in flow would result from a given amount of timber harvest. Most studies agree that the effects of harvest treatment decreases as the flow event size increases (Rothacher 1971, Rothacher 1973) and is not detectable for flows with a two year return interval or greater (Harr et al. 1975, Ziemer 1981).

Additionally, studies have found that the regrowth of shrubs and small trees commonly returned rates of evapotranspiration to pre- logging levels within four to eight years following harvest (Harr et al 1979, Keppeler and Ziemer 1990). The areas proposed for regeneration harvest account for less than one percent of the forested acreage in any of the affected subwatersheds, and any effects to annual yield and low flows would be expected to be negligible.

No measurable effect to stream flow would be anticipated as a result of commercial thinning or density management because it would involve only partial removal of vegetation on areas constituting three percent or less of each affected subwatershed. In an overview of several studies, Satterlund and Adams (1992, p.253) found that water yield responses were less substantial when partial cutting systems removed a small portion of the cover at any one time. Where individual trees or small groups of trees are harvested, the remaining trees generally use any increased soil moisture that becomes available following timber harvest.

3. Water Rights

Surface water rights for domestic use located within one mile downstream of one proposed commercial thinning unit treatment would not be affected. As described above, there would be a negligible risk to increased peak flows from the proposed action. No effects from sediment or increases in water temperature would be expected. Consequently, there are no anticipated impacts to water quantity, timing or quality anticipated from the proposed timber management.

IV. Botany

A. Alternative One – No Action

1. Vascular Plants, Lichens and Bryophytes

In the absence of timber management there would be no direct effect to any populations of Kincaid's Lupine that may occupy the project area. Over time, however, the species would be indirectly affected because without timber harvest or other vegetation management to create and maintain gap and edge habitat, the availability of light would decline to a level insufficient to trigger flowering and reproduction.

As with Kincaid's Lupine, no direct effect would be expected to any populations of Oregon Bensoniella, tall bugbane and wayside aster that may be present in the project area. These species, too, are dependent on gap and edge habitat, so that absent timber management or other vegetation management, available light would decline to levels insufficient to trigger flowering and reproduction.

2. Fungi

Absent timber management activities, there would be no modification of existing habitat conditions and the availability of host trees for ectomycorrhizal fungi would remain unchanged.

Existing forest canopy would continue to provide shade and maintain cooler temperatures and higher humidity on the forest floor. Forest litter, soil organic matter and large woody debris would be undisturbed and continue to provide reservoirs of moisture and nutrients.

B. Alternative Two – The Proposed Action

1. Vascular Plants, Lichens and Bryophytes

There would be no direct effect to any Kincaid's lupine populations that might be found during surveys in the project area because these populations would be managed in a manner that would maintain site integrity, while opening up the forest canopy. This would increase available sunlight resulting in greater growth and plant vigor.

There would be no direct effect to any populations of Oregon Bensoniella, tall bugbane and wayside aster if found during surveys of the project area, as these sites would also be managed to maintain site integrity. As these species are also dependent on edge and gap habitat, reductions in forest canopy and increases in available sunlight would have results akin to those for Kincaid's lupine.

No cumulative effects to known populations would be anticipated as they are generally located in other watersheds and spatially separated by substantial distances.

2. Fungi

The proposed timber harvest would not affect any known sites for Bureau Sensitive fungi species described on page 35, as there are no known sites in the South Umpqua River fifth-field watershed.

Surveys for these species are not considered practical for reasons discussed in Chapter Three on page 35, so their presence is unknown. If fungi are present in the proposed commercial thinning and density management units, loss of the sites could result as a consequence of the removal of substrate and modification of microclimate, as described in the *Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (USDA and USDI 2007 p. 37).

Cumulatively, limited loss of individual fungi and habitat would not be expected to affect long-term viability and persistence of these species because, as described in Chapter Three on page 35, most of these species are dependent on a well distributed network of late-seral forest with moist and shaded conditions. The 236 acres of regeneration harvest proposed in this assessment represents less than one percent of the late-seral forest provided by BLM-managed lands in the watershed, much of which is withdrawn from the timber management base. Density management in Late-Successional Reserves would also accelerate development of late-seral forest conditions providing additional habitat over the longer term.

V. Soils

A. Alternative One – No Action

There would be no direct effect on the soils in the project area. There would be no soil displacement or compaction associated with road and landing construction, and log yarding.

Compacted soils on the old skid trails and skid roads would recover slowly, especially at depths below 6 inches (Amaranthus et al 1996; Powers et al 2005).

Absent wildfire, the duff layer and soil organic matter would continue to increase slowly as accumulations of needles, twigs and small branches, and larger woody material decompose.

B. Alternative Two – The Proposed Action

Under the proposed action alternative, soil displacement and compaction could be expected to result from the construction of roads and landings, and from the yarding of timber. Reductions in soil productivity can be minimized by limiting the areal extent of soil disturbance and displacement, and the degree to which soils are compacted. Surface erosion and loss of organic nutrients can be controlled by applying erosion control measures.

The impact of landings is primarily associated with the road prism where yarding, log sorting and decking, loading, and hauling occur. For cable operations, yarding will result in some soil displacement immediately below the landings. For all methods of yarding, some soil disturbance can be expected from the decking of logs, typically on road edges or immediately below landings.

On temporary roads and landings located on them, soil productivity would be decreased by displacement and compaction. Construction of proposed permanent roads and all-weather landings for helicopter yarding would constitute a decision to withdraw those lands from the harvest land base as single-use facilities.

Temporary spur roads and landings located on temporary roads would be sub-soiled with several offset passes of tilling equipment that can bring about greater than 80 percent soil fracturing. Although tillage does not bring about 100 percent recovery from soil compaction, it is an important step in recovery (Luce 1997). Tillage helps prevent runoff and erosion by reducing soil compaction and increasing water infiltration into the soil. Tillage, however, does not restore detrimental soil displacement.

Past monitoring of commercial thinning and density management timber sales on the South River Resource Area has shown that harvest operations with tractors, rubber tired skidders, shovel loaders, and harvester/forwarders affected from three to nine percent of ground based harvest areas, with the average less than six percent. These figures include landings, major skid trails, and old trails that were re-used, and are all within the ten percent limitation established by the ROD/RMP. The areal extent, amount of displacement, and depth of compaction was generally the least with harvester/forwarders. For regeneration harvest, effects would also be expected to remain within the ten percent limit.

Ground-based harvest in commercial thinning and density management operations would be conducted with harvester/forwarder equipment. Operations would be subject to standard Best Management Practices and project design features intended to reduce potential effects to soils associated with disturbance, displacement and compaction.

Operations would be restricted to the dry season when soils are least susceptible to compaction. Harvester/forwarders would operate on top of limbs, tree tops, and other logging residues to minimize soil displacement and reduce ground pressure and potential compaction. Operations on designated trails and on slopes generally less that 35 percent would further reduce the potential for soil displacement. Pre-designation of trails would avoid areas of high water table particularly susceptible to compaction, even in the dry season, avoid areas of rocky soils that would be at greater risk for displacement, and minimize the area affected by trails.

Ground-based operations in regeneration harvest units would be conducted with other types of equipment capable of handling logs larger than harvester/forwarders are capable of processing and moving. This equipment would be subject to the same requirements for dry season harvest, restrictions to gentle slopes, and pre-designation of skid trails that would govern the use of harvester/forwarders described above. All skid trails would be subsoiled and water-barred upon completion of harvest and site preparation.

The degree of soil disturbance caused by cable yarding varies with topography (convex vs. concave slope), slope steepness, angle of yarding with respect to the face of the slope (perpendicular vs. sideslope), and the number of logs yarded. Cable yarding generally produces localized areas of soil disturbance along the yarding corridors, with the greatest disturbance within 100 feet of the landing. Requiring a minimum of one-end log suspension reduces the degree of displacement and compaction soils would be subjected to in the corridors. Requiring lateral yarding capability and location of landing at periodic intervals, as described on page 13 in Chapter Two, reduces areal extent of disturbance and compaction.

Past monitoring of commercial thinning activities under similar site conditions and project design features has shown that cable yarding resulted in less than two percent soil disturbance in cable yarded areas, including the landings. Effects within corridors varied from little or no disturbance, to partial duff removal, to displacement of the top one to three inches of soil. Compaction was low to moderate, typically shallow, and concentrated in the center of the corridors. This is not considered sufficient to affect soil productivity.

In regeneration harvest, the width of the disturbance and depth of compaction in yarding corridors would be greater because of the larger size and greater volume of timber being yarded. Individual landings would be larger than are seen in commercial thinning and density management units, but would be fewer in number because logs are yarded in a fan-shaped pattern unlike the parallel corridors and lateral yarding common in thinning where care must be taken to protect the remaining trees. Consequently, the area affected would not differ much from what is common in thinnings.

Helicopter yarding would produce even less effects as the area would be limited to the distance needed for the lower end of logs to clear the ground surface.

As discussed on page 37 in Chapter Three, Category 1 soils are highly sensitive to the effects of prescribed burning. To maintain long-term soil productivity and retain organic matter and duff, the six regeneration units containing large areas of Category 1 soils would be hand piled and burned. Woody material up to six inches in diameter would be hand piled. The hand piles would be burned in late autumn or early winter, after or during prolonged periods of precipitation when the soils and duff are well-wetted, and moisture content of woody material surrounding and adjacent to the piles is high.

Overall, the effects to soil productivity would be minor, since the total surface area affected by the burned piles would be small. The unburned areas would retain the duff, surface litter and soil organic matter in the surface soil, as well as the medium to larger woody material.

Broadcast burning is proposed for Units 30-4-93B and 30-4-04B. As described on page 7 in Chapter Two, where proposed, broadcast burning would be accomplished in the spring when moderate temperatures and high moisture content in soils, duff and large woody debris would minimize fire intensity and duration. This would limit loss of or damage to snags and retention trees; limit consumption of duff, surface litter and large woody debris; maintain soil productivity; and minimize the scope and duration of impacts to air quality

With the application of Best Management Practices and project design features described above, soil erosion would be limited and localized, and any reductions in soil productivity would be low. These effects would not exceed the level and scope of effects considered and addressed in the PRMP/EIS (Chapter 4, pp. 12-16).

VI. Fuels Management/Fire Risk and Air Quality

A. Alternative One – No Action

Fuels Management/Fire Risk

Lightning has historically been the primary cause of wildfires, but wildfire occurrence has increased due to increases in dispersed recreation in forested settings, debris burning on private residences located within the Wildland Urban Interface, and timber management activities on private and public lands.

Under this alternative, there would be no short-term increase in fuel load on BLM-managed lands associated with timber harvest and the fire risk associated with the subject forest stands would remain low to moderate.

Over the longer term, fuel load in the proposed regeneration harvest units would remain relatively stable or increase gradually, barring a major disturbance from wind, disease, or insects. Absent these forms of large-scale disturbance, gaps in the forest canopy would occur as individual trees or small groups of trees die. These gaps would be reoccupied by overstory and understory trees, and in time some understory trees would die from suppression. Absent the periodic occurrence of low intensity fires, the accumulation of branches, needles, and dead and suppressed trees would result in fuel loads exceeding historic levels, posing an increasing risk of fire (Oliver and Larson 1996).

The effects of suppression mortality were modeled in Organon Stand Growth and Yield Model, Version 8.2, Southwest Oregon. Proposed commercial thinning Unit 29-3-27C is representative of a stand with a current fuel load of 20 tons per acre. Modeling indicates that, without thinning approximately seven trees per acre greater than six inches diameter breast height would die over the next ten years, and an additional seven trees per acre greater than six inches diameter breast height would die in the following decade.

The volume of accumulated bole wood that resulted would be approximately 130 cubic feet per acre in the first decade, and an additional 132 cubic feet per acre in the second decade. Air-dry Douglas-fir has a specific gravity of 0.48 (USDA 1974, p. 4-46) which is a density of approximately 30 pounds per cubic foot. This would equate to an increase of approximately two tons per acre of large fuels (1000-hour +) per decade. These figures would be higher, however, because the model only calculates the volume of bole wood that is at least six inches in diameter, does not capture mortality in smaller diameter trees, nor account for the volume of the needles, limbs and portions of the tree bole that do not meet the minimum analytic diameter. Consequently, the actual accumulation could be more than double the model projections, and present fuel load could increase by over 50 percent in two decades.

Under conditions of drought and extreme fire weather, in conjunction with abnormally heavy fuels accumulations, a fire could result in stand replacement in mid-seral and late-seral stands alike. In addition to a loss of the timber in the stands proposed for harvest, fire could spread to nearby stands of all age classes resulting in loss of present and future timber volume on BLM-administered lands, loss of private investment and return where private timber lands are involved, and potential loss of structures and improvements on residential and agricultural properties.

Private timber harvest would continue and would generate activity fuels that may elevate fire risk in the watershed. The extent is difficult to gauge, however, because there is no way to project the level of utilization or fuels treatments that would be practiced.

Air Quality

Absent any timber harvest, there would be no application of prescribed fire for site preparation and hazard reduction on BLM-managed lands, and consequently no effects to air quality. Prescribed burning may occur on private timber lands in conjunction with post-harvest site preparation. As such activities would be subject to State of Oregon smoke management restrictions, no long term degradation of air quality should occur.

B. Alternative Two – The Proposed Action

Fuels Management/Fire Risk

Short-term increases in fire risk would exist associated with increases in dead woody fuels. In the proposed regeneration harvest units, woody residues would increase by an estimated 27.9 tons per acre, as depicted in 4-DF-4-PC from *Photo Series for Quantifying Forest Residues in the Coastal Douglas-Fir – Hemlock Type* (Maxwell and Ward, 1976).

Material greater than 20 inches in diameter, and reserved as large down wood debris under present management direction, would add an additional 3 to 5 tons per acre to current fuel loads. Fine fuels less than 3 inches in diameter would total approximately 9.3 tons/acre or one-third of the total increase in fuel load. Fuels 3.1 to 9 inches in diameter would account for approximately 16.0 tons/acre, and fuels 9.1 to 20 inches in diameter would account for another 2.6 tons/acre. These are approximations and actual tonnage of down wood greater than 9 inches in diameter would be influenced by log defect and recovery, harvest methods, and market conditions that could influence utilization of marginal logs.

For the two units proposed for broadcast burning, one would expect that almost all of the woody debris less than 1 inch in diameter would be consumed, along with approximately 60 percent of the one inch to three inch diameter woody debris (Gillette et al, 1978). Consumption of material 3.1 to 9 inches in diameter would be approximately 10 to 20 percent, while there would be no effective consumption of material greater than 9 inches in diameter. Consequently, post-treatment fuel load would be 21 to 24 tons/acre.
The majority of large, stand replacing wildfires have involved multiple ownerships and were either started in or intensified by untreated activity fuels. Fire intensity and severity has also increased by the exclusion of fires from fire-dependent ecosystems allowing for an unnatural buildup of naturally occurring fuels.

Increases in fuel tonnage from pre-harvest conditions would not increase wildfire risk. Wildland fires, like campfires, begin in the small diameter pieces of wood that must generate enough heat before larger fuels ignite. As broadcast burning would essentially consume all the smaller diameter fuels, it would effectively remove the risk of ignition and reduce the risk of wildfire in the short term.

For the remaining regeneration harvest units, site preparation and fuels reduction would be accomplished by hand piling and burning. This would remove almost all material up to six inches in diameter over approximately 60 percent of the area of individual units. Post-treatment, total fuel loading would be approximately 20 to 22 tons/acre. In addition to removing the finer fuels that are the most susceptible to ignition, and effecting a short-term reduction in wildfire risk, the treatment would alter the arrangement and continuity of fuels and allow fire suppression personnel opportunities for rapid containment and control of any future wildfires.

The commercial thinning units would have a small, short term increase in fire risk due to the increase in fine fuels created during the harvest activities. These fine fuels however, would degrade naturally in a matter of a few years, reducing the fire risk over time.

As described in the PRMP/EIS (Chapter 4-97 & 98), due to the fragmented ownership pattern that is typical in the project areas and common throughout the South River Resource Area, wildfire potential is not dependent on BLM management activities alone.
The majority of large, stand replacing wildfires have involved multiple ownerships and were either started in or intensified by untreated activity fuels. Fire intensity and severity has also increased by the exclusion of fires from fire-dependent ecosystems allowing for an unnatural buildup of naturally occurring fuels.

The primary factors that could increase the relative risk of wildfire are increased fuel amounts produced by timber management and silvicultural stand treatments, and an unnatural build up of fuels arising from fire suppression. Prescribed burning and other types of fuels management would reduce the relative risk of wildfire. Brushing, pre-commercial thinning, pruning and commercial thinning or brushing in early-seral and mid-seral stands would facilitate hazard mitigation in a number of ways. Thinning at both the pre-commercial and commercial levels would reduce bulk crown density and canopy continuity. Brushing and pruning removes ladder fuels that may transport ground fire into tree canopies. It is acknowledged that these activities create short-term increases in fire risk, but these are again short-term because the fuels involved are generally the finer fuels that deteriorate in a short period of time.

Air Quality

For those units proposed for broadcast burning, ignition would be conducted when the prevailing winds are blowing away from the Roseburg Designated Area in order to minimize or eliminate the potential for smoke intrusions. Additional measures that would be employed to further minimize smoke intrusion would include: burning units slowly; avoiding multiple ignitions in close proximity to one another; and burning under atmospheric conditions that favor good vertical mixing so that smoke and other particulate is borne aloft and dispersed by upper elevation winds.

State of Oregon smoke management restrictions limit or prohibit burning during periods of stable atmospheric conditions when residual smoke from previously burned units may become trapped by a surface inversion. Where surface inversions develop within 24 hours of unit ignitions, aggressive mop-up would be conducted to minimize the potential for residual smoke affecting the local airshed.

Broadcast burning could have short-term effects to air quality on ignition days, akin to those described in the PRMP/EIS (Chapter 4-10). Specifically, restricting prescribed burning to the period of March through May, when duff and dead woody fuels have the highest moisture content, reduces fuel consumption, particularly large fuels, and reduces smoke emissions that impact air quality. In the event of smoke intrusion, effects to air quality in Roseburg Designated Area could persist for up to 24 hours.

Effects to air quality within about one-quarter miles of units proposed for broadcast burning could persist for 3 to 5 days and be characterized by some haziness. No units are sufficiently close to major highways where motorist safety concerns would exist.

For those units on which hand piling and burning is proposed for hazard reduction and/or site preparation, piles would be burned in the autumn or winter months during unstable fall and winter weather conditions when winds and atmospheric instability favor rapid smoke dispersion, and precipitation washes particulates from the air. Potential impacts to air quality within one-quarter to one mile of units would persist for 1 to 3 days and would be characterized by some haziness.

With the application of Oregon smoke management restriction, previously discussed, prescribed burning would not have cumulative and long-term effects to local air quality.

VII. Monitoring

Monitoring of the effects of the proposed action, if implemented, would be done in accordance with provisions contained in the ROD/RMP, Appendix I (p. 84-86 and 190-199), focusing on the effects of timber harvest on: Riparian Reserves; Late-Successional Reserves; Matrix; Air Quality; Water and Soils; Wildlife Habitat; Fish Habitat; and Special Status Species Habitat.

Chapter Five
List of Agencies and Individuals Contacted; Preparers; and Literature Cited

A notice of initiation of the analysis was published in the Winter 2007 Quarterly Planning Update. Upon completion and release of the EA, a Notice of Availability for public review and comment will be published in *The News-Review*, Roseburg, Oregon.

I. Agencies & Persons Contacted:

Adjacent Landowners & Down-stream Water Users
Cow Creek Band of Umpqua Tribe of Indians
National Marine Fisheries Service
U.S. Fish and Wildlife Service

II. The following agencies, organizations, and individuals will be notified of the completion of the EA:

Cascadia Wildlands Project
Douglas Timber Operators, Robert Ragon - Executive Director
Gene and Elaine Hicks
Klamath Siskiyou Wildlands Center
National Marine Fisheries Service
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Oregon Department of Fish and Wildlife
Oregon Wild
Pacific Northwest 4-Wheel Drive Association
U.S. Fish and Wildlife Service
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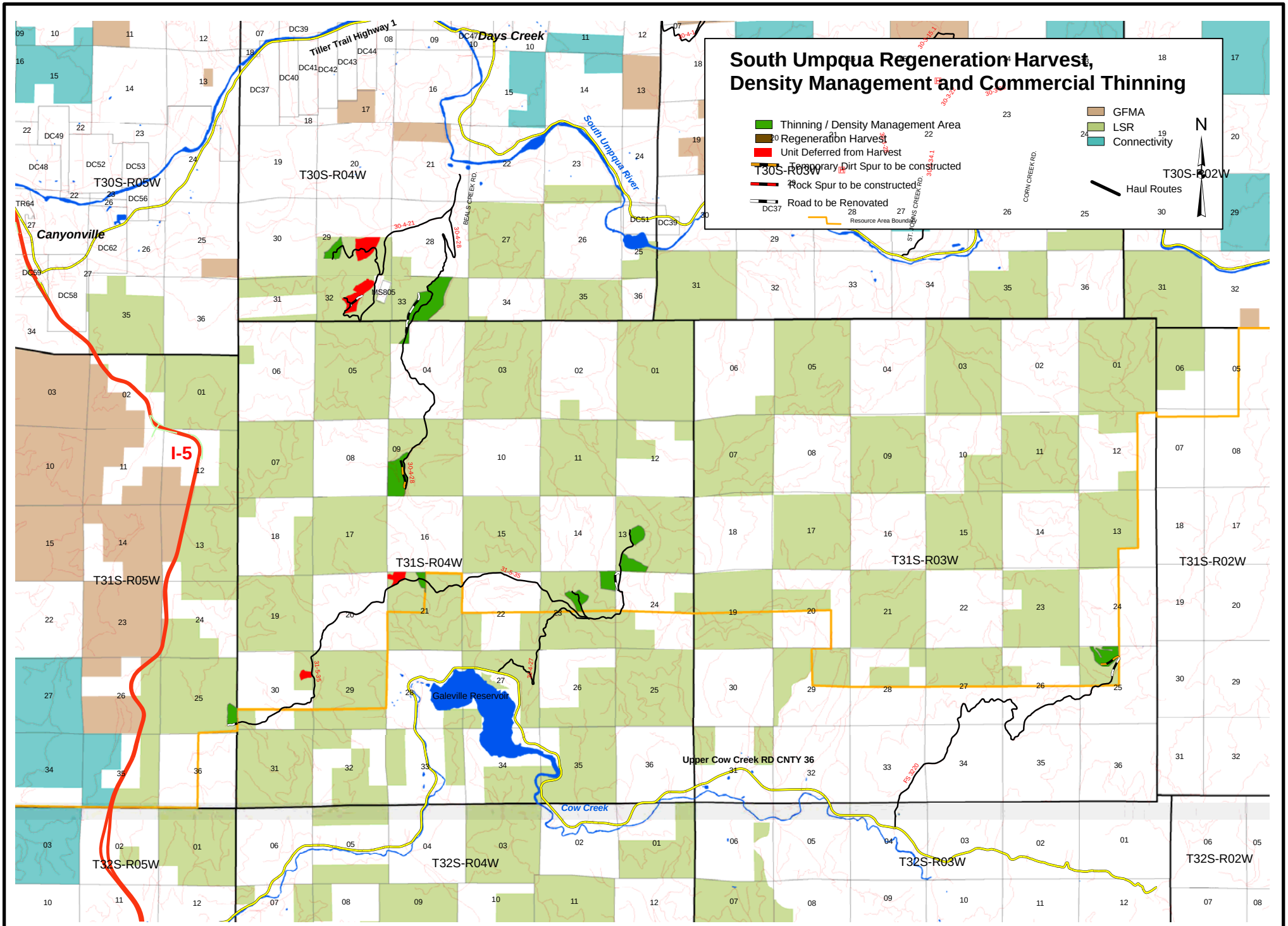
Appendix A

Vicinity Maps and Maps of the Proposed Timber Management Units


South Umpqua Regeneration Harvest, Density Management and Commercial Thinning
Thinning / Density Management Area
Regeneration Harvest
Unit Deferred from Harvest
Temporary Dirt Spur to be constructed
Rock Spur to be constructed
Road to be Renovated
Resource Area Boundary
GFMA
LSR
Connectivity
Haul Routes
N
Days Creek
Tiller Trail Highway 1
South Umpqua River
Canyonville
I-5
Galeville Reservoir
Upper Cow Creek RD CNTY 36
Cow Creek
BEALS CREEK RD.
CORN CREEK RD.
ST. JOHNS CREEK RD.
T30S-R05W
T30S-R04W
T30S-R03W
T30S-R02W
T31S-R05W
T31S-R04W
T31S-R03W
T31S-R02W
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T32S-R03W
T32S-R02W
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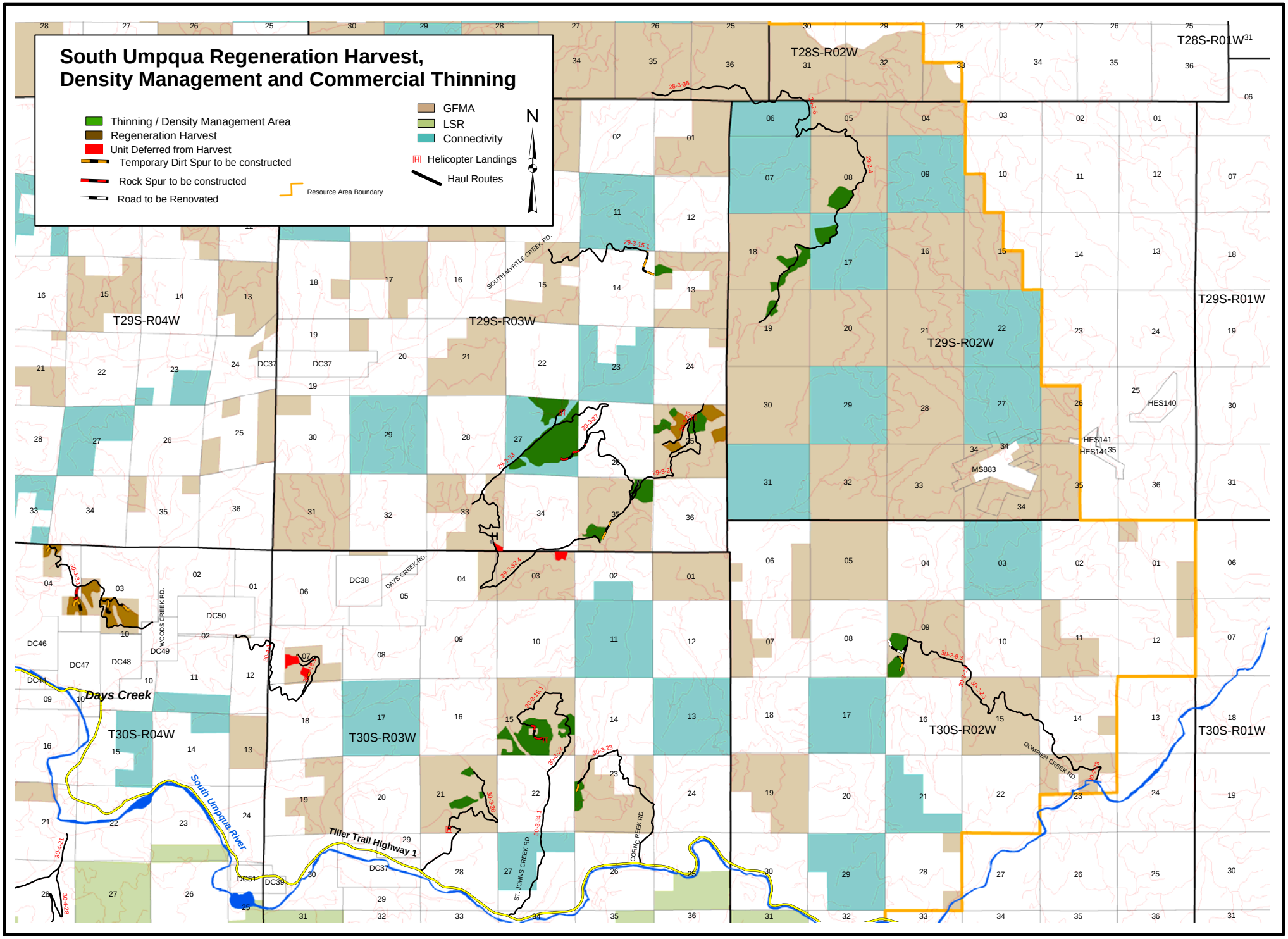
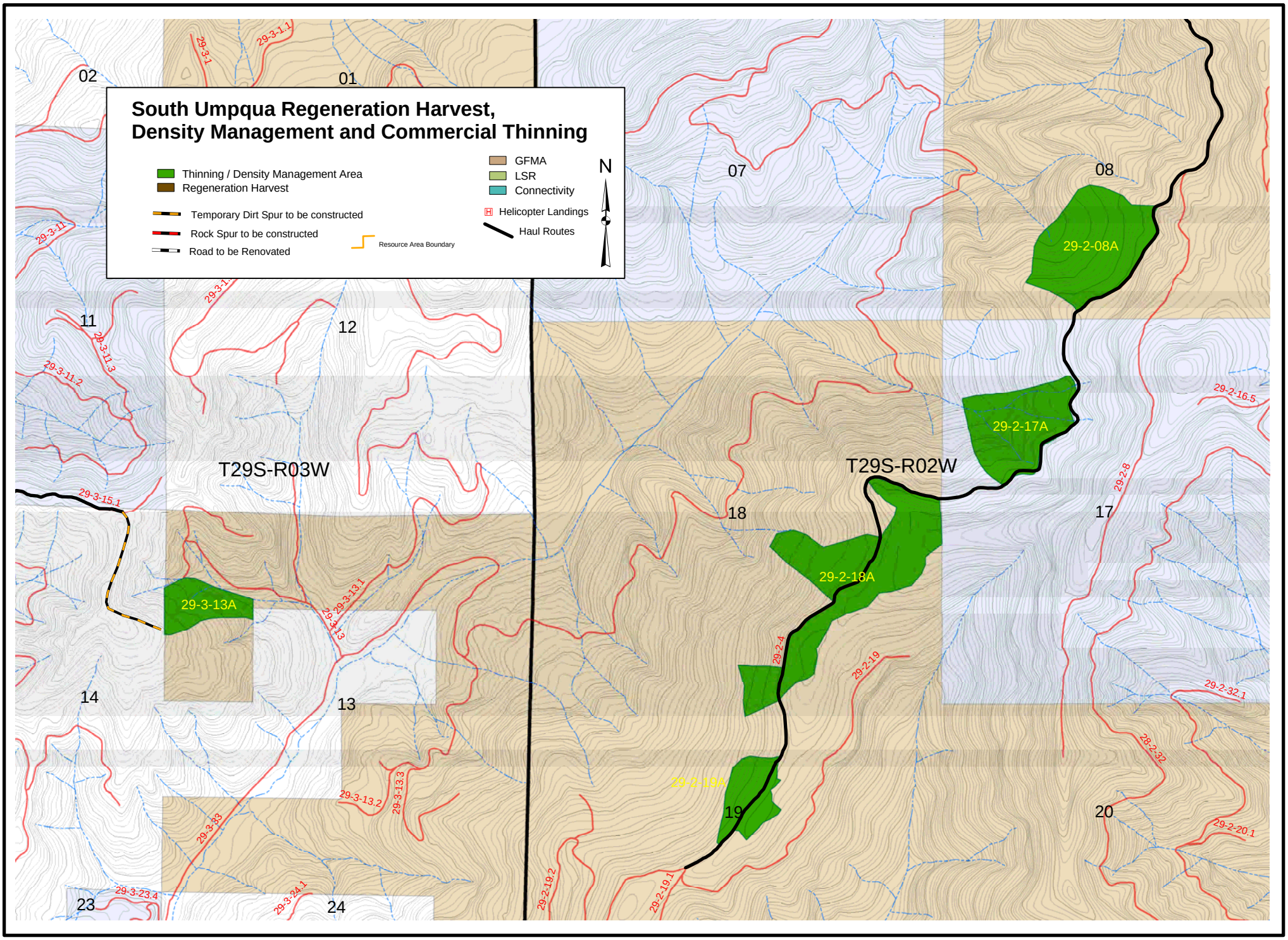
4 Miles
Scale = 1:100000


South Umpqua Regeneration Harvest,
Density Management and Commercial Thinning
Thinning / Density Management Area
Regeneration Harvest
Unit Deferred from Harvest
Temporary Dirt Spur to be constructed
Rock Spur to be constructed
Road to be Renovated
Resource Area Boundary
GFMA
LSR
Connectivity
Helicopter Landings
Haul Routes
N
T28S-R02W
T28S-R01W
T29S-R04W
T29S-R03W
T29S-R02W
T29S-R01W
T30S-R04W
T30S-R03W
T30S-R02W
T30S-R01W
SOUTH MYRTLE CREEK RD.
DAYS CREEK RD.
WOODS CREEK RD.
DOMPIER CREEK RD.
ST. JOHNS CREEK RD.
CORNC REEK RD.
Days Creek
South Umpqua River
Tiller Trail Highway 1
HES140
HES141
MS883
0
4 Miles
Scale = 1:100000



Contour interval = 20 feet

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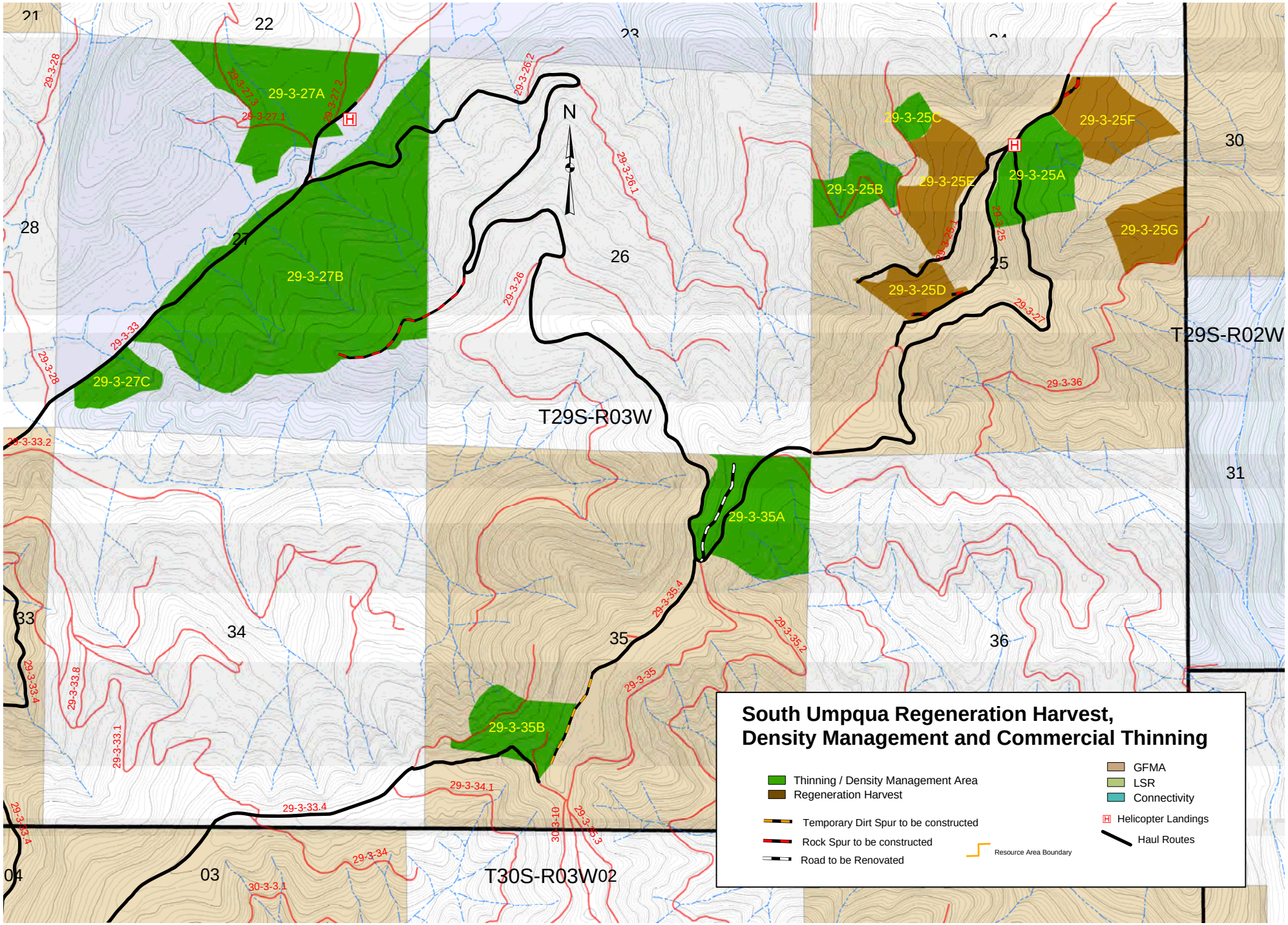
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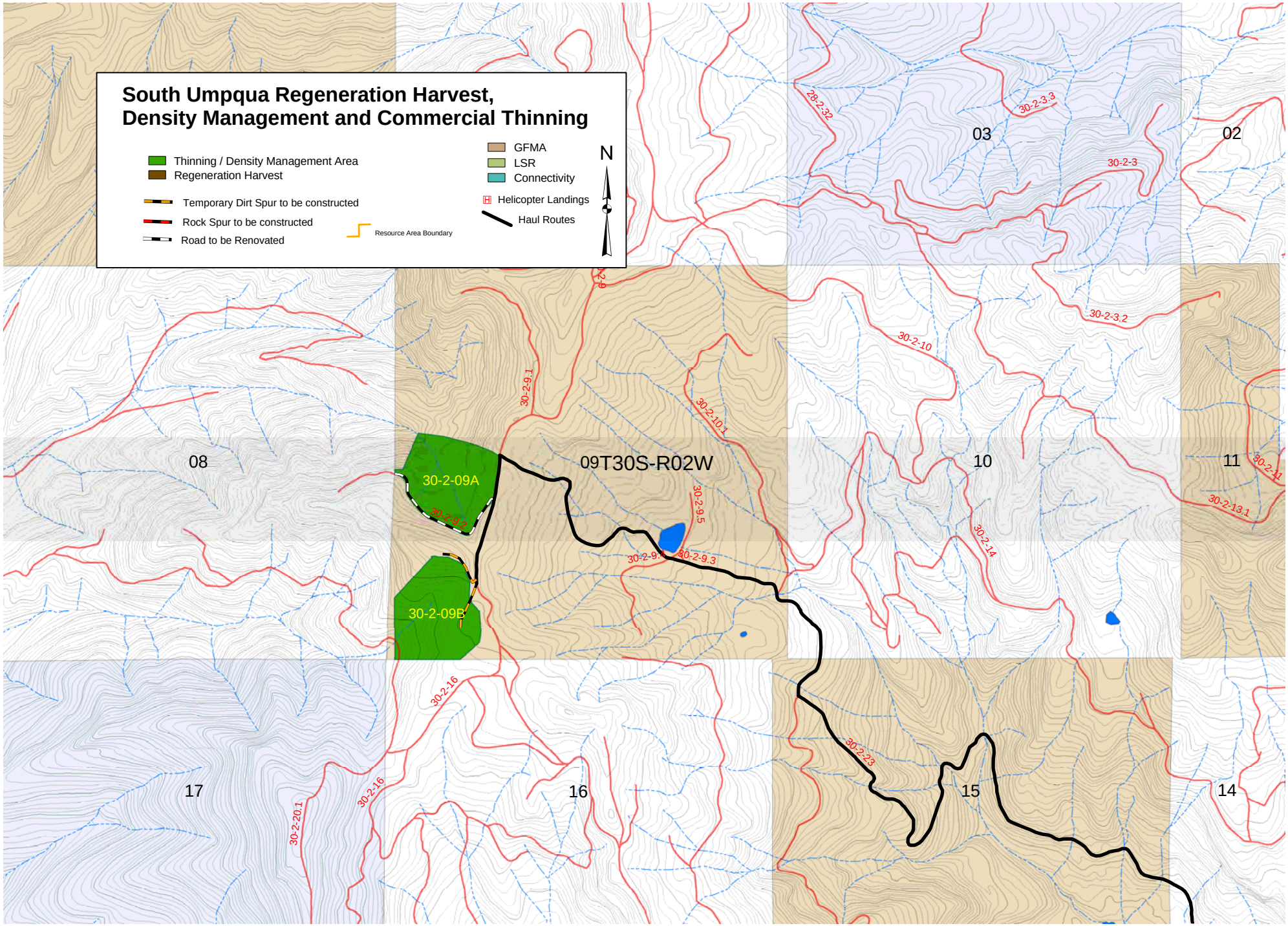
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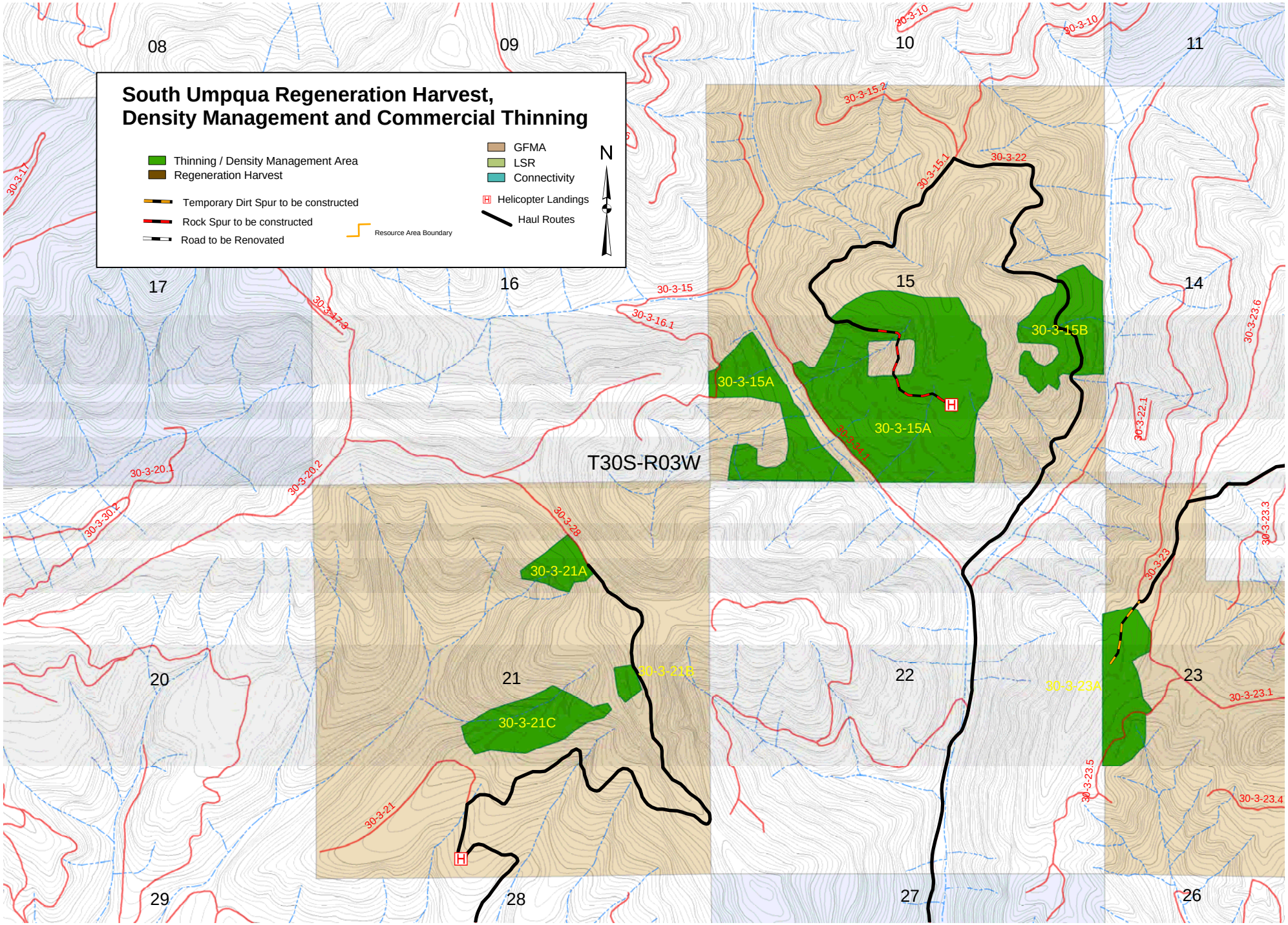
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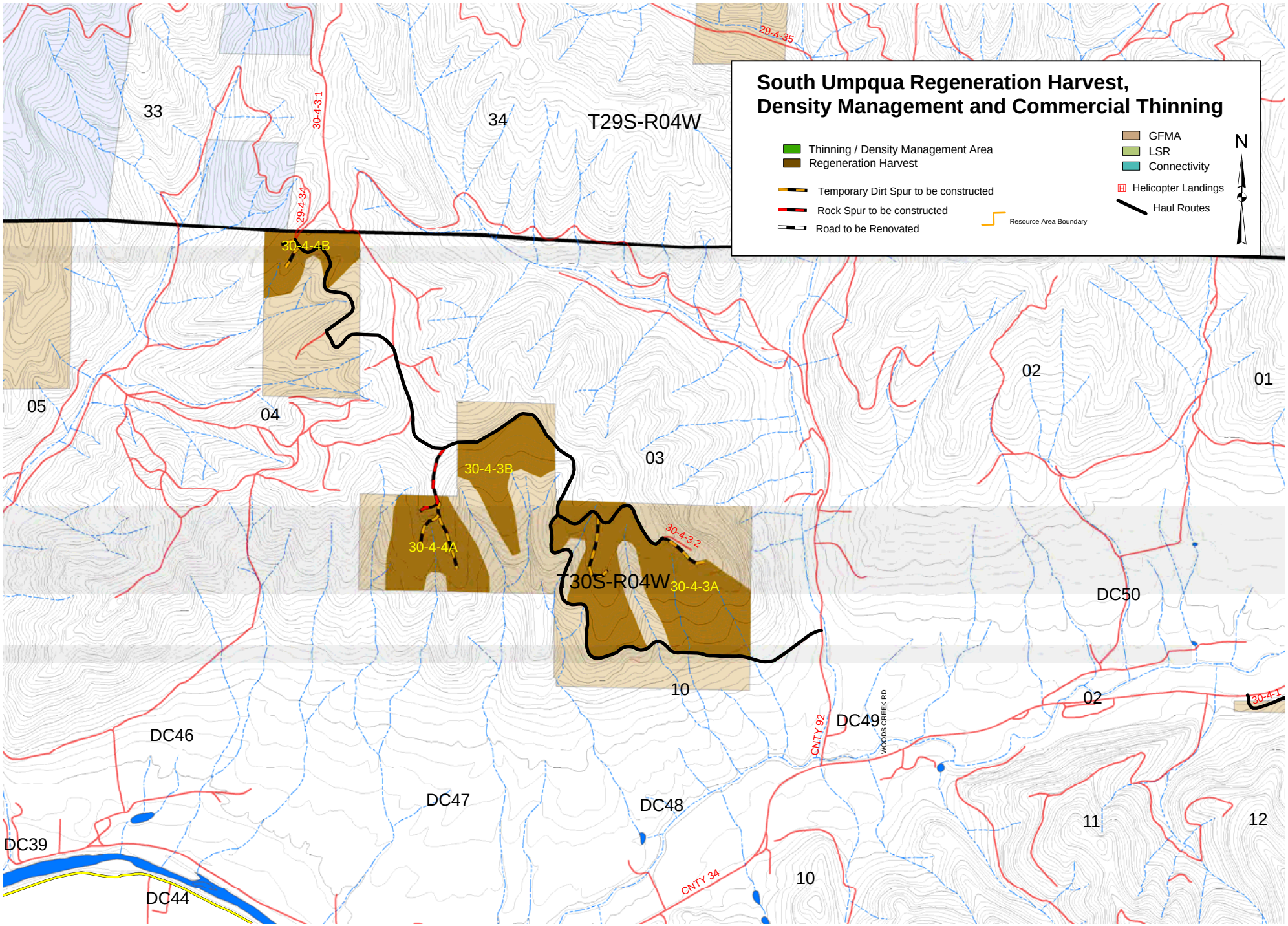
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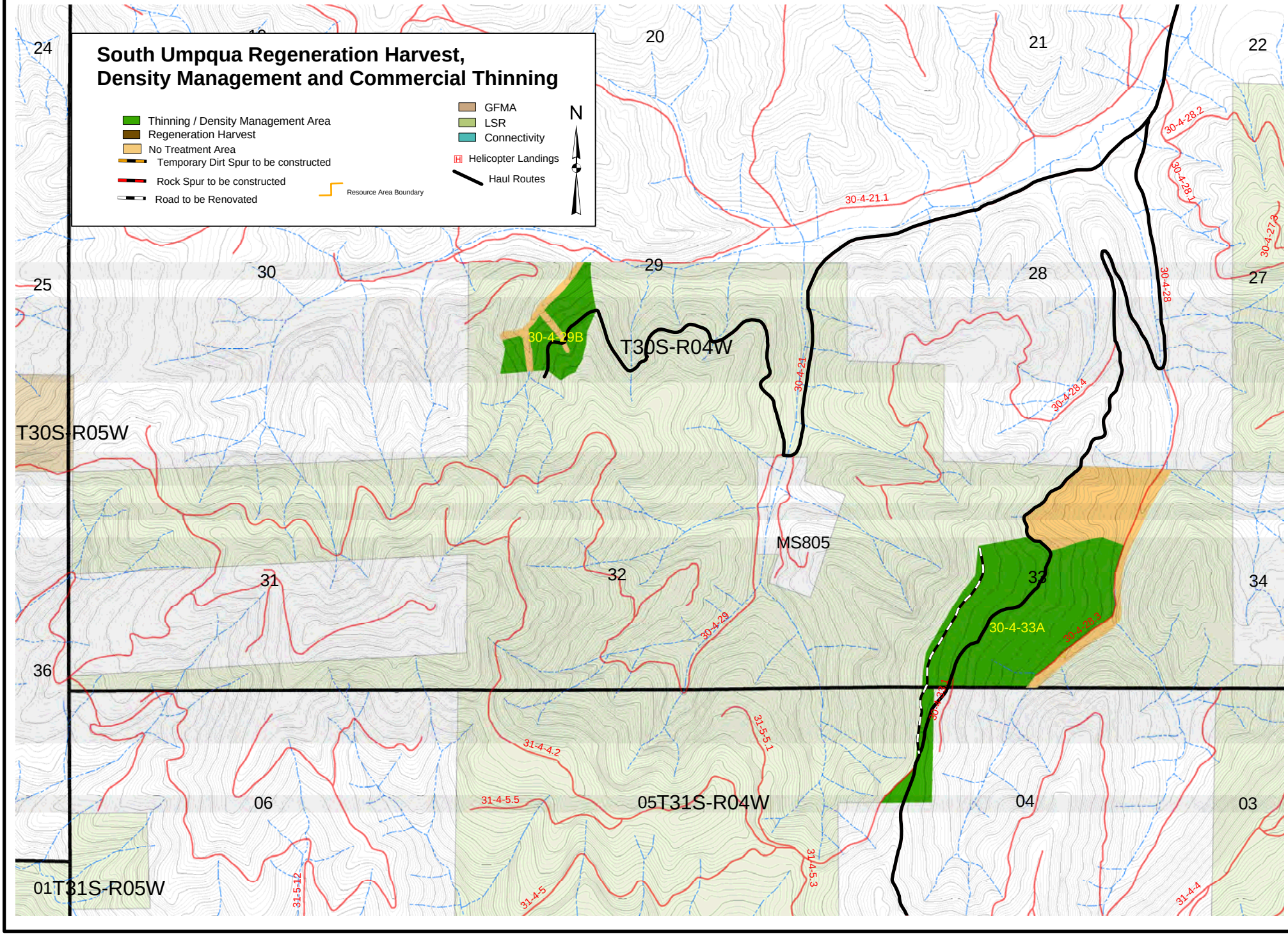
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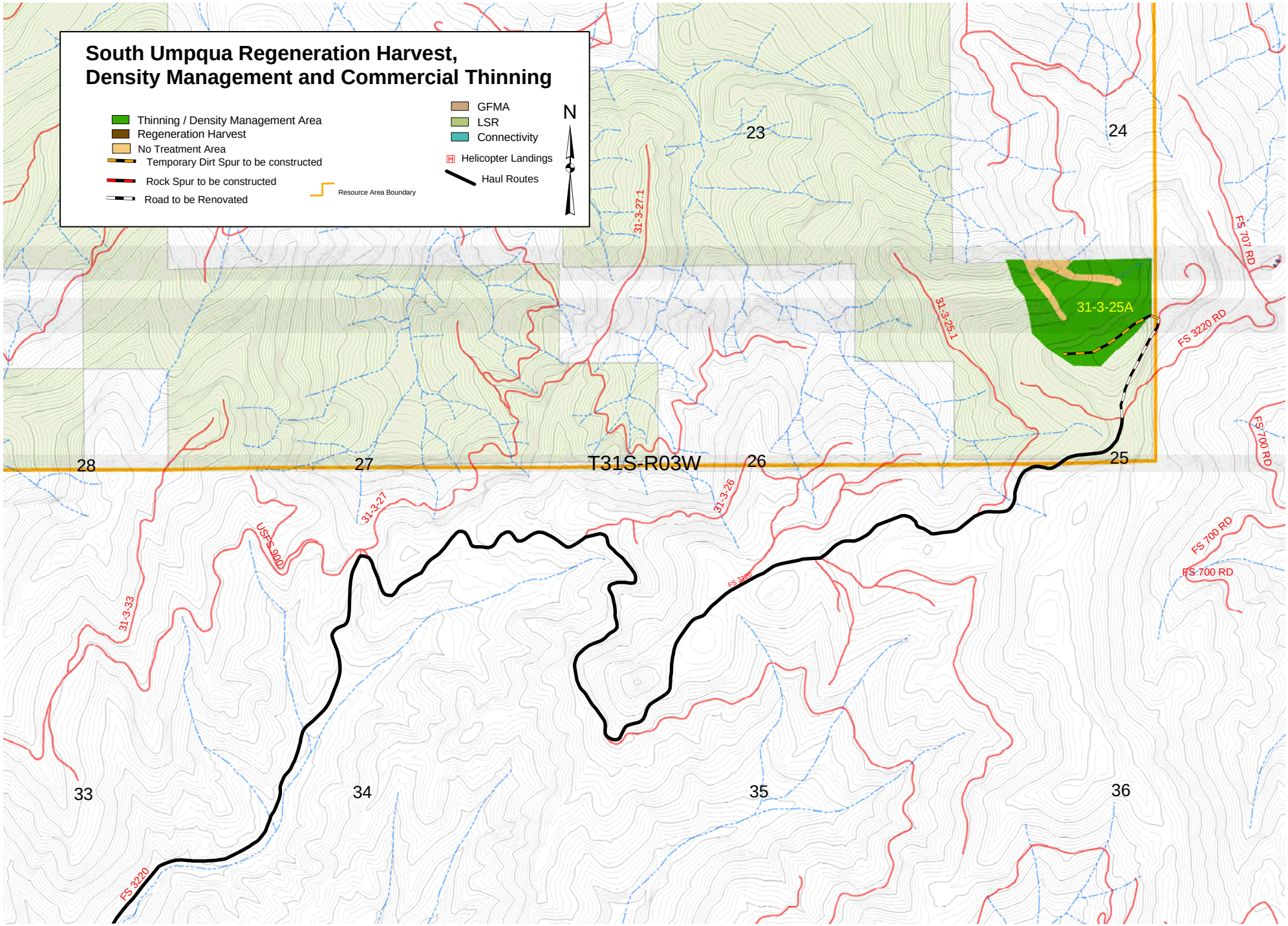
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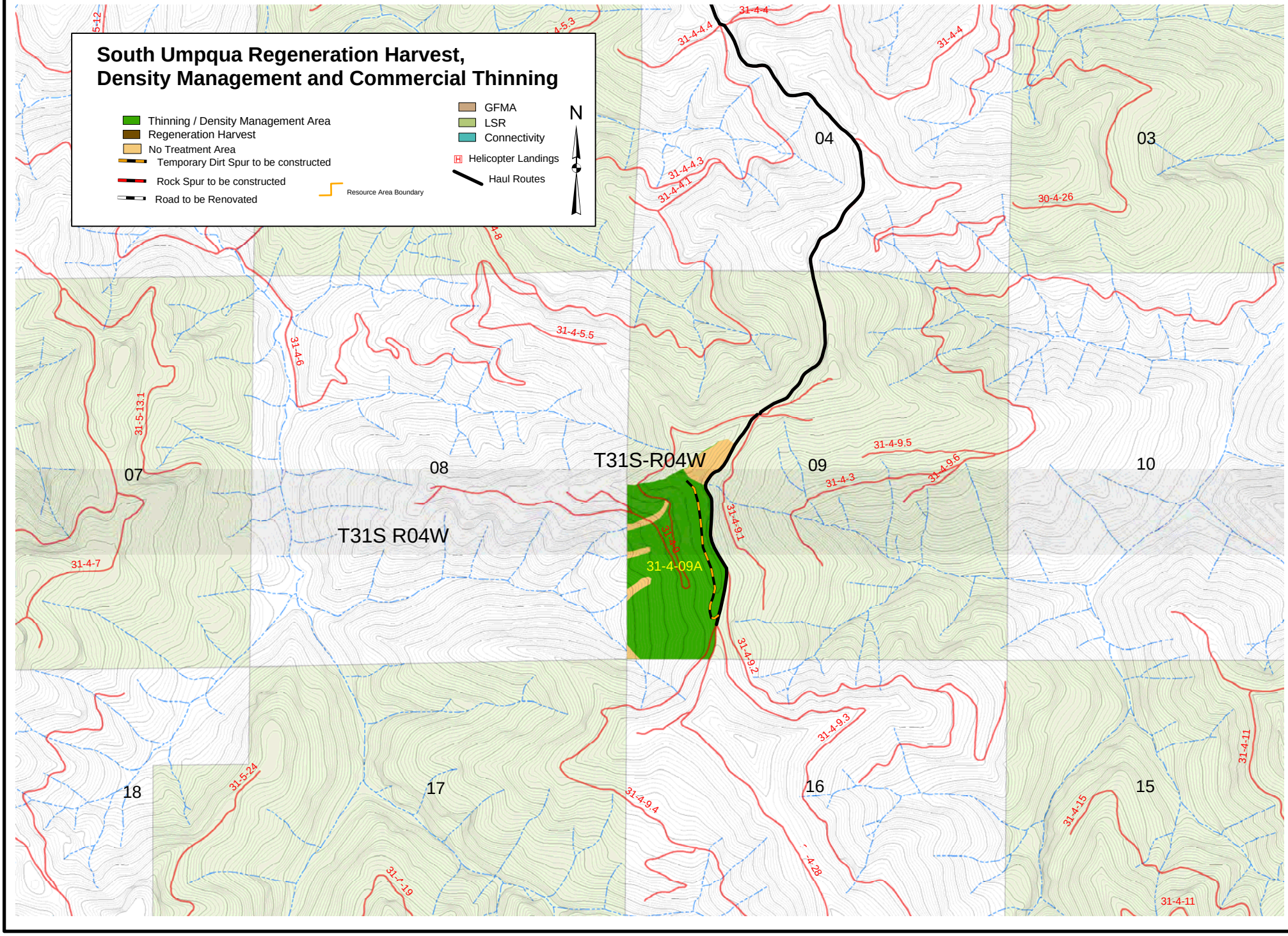
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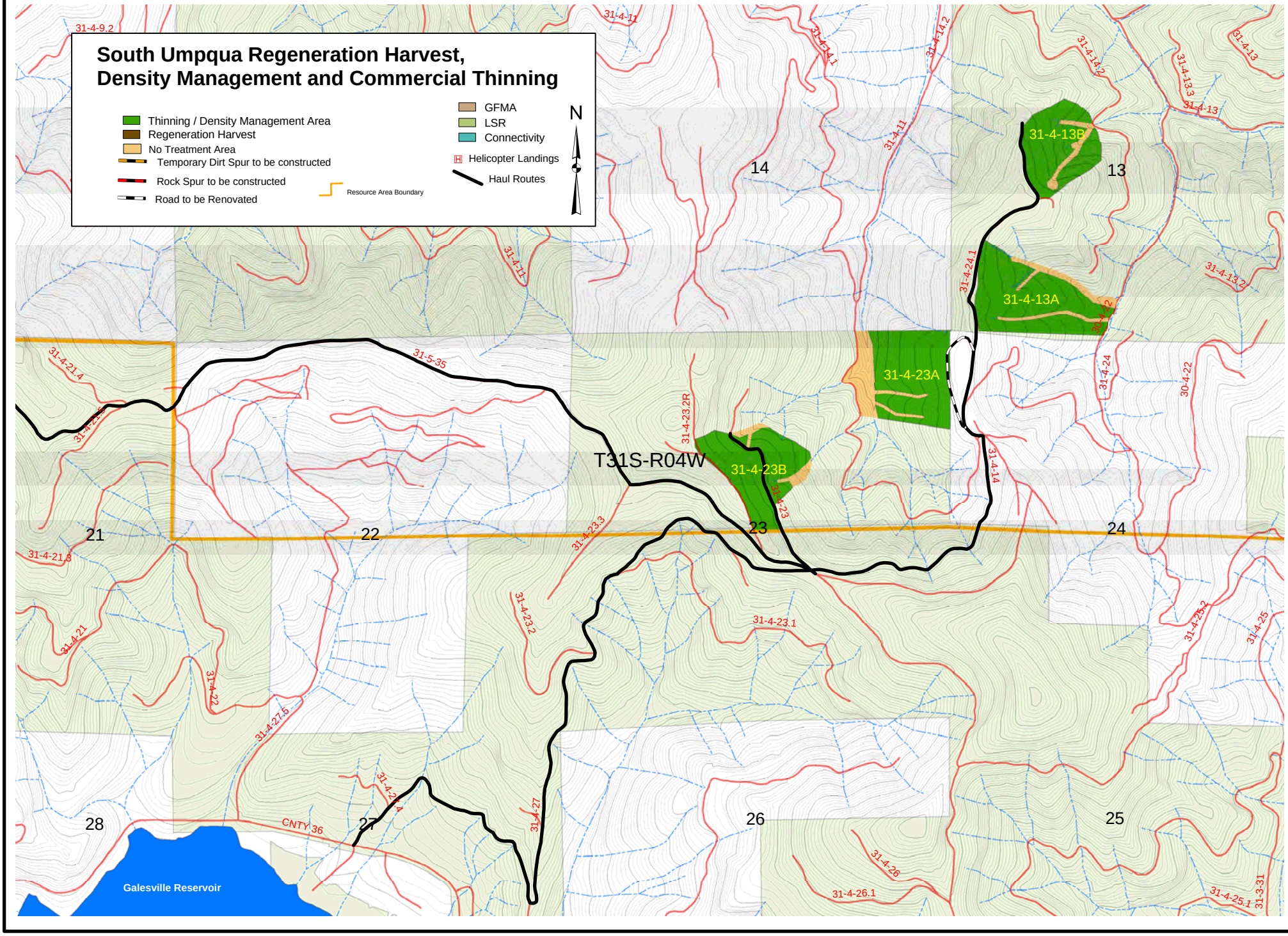
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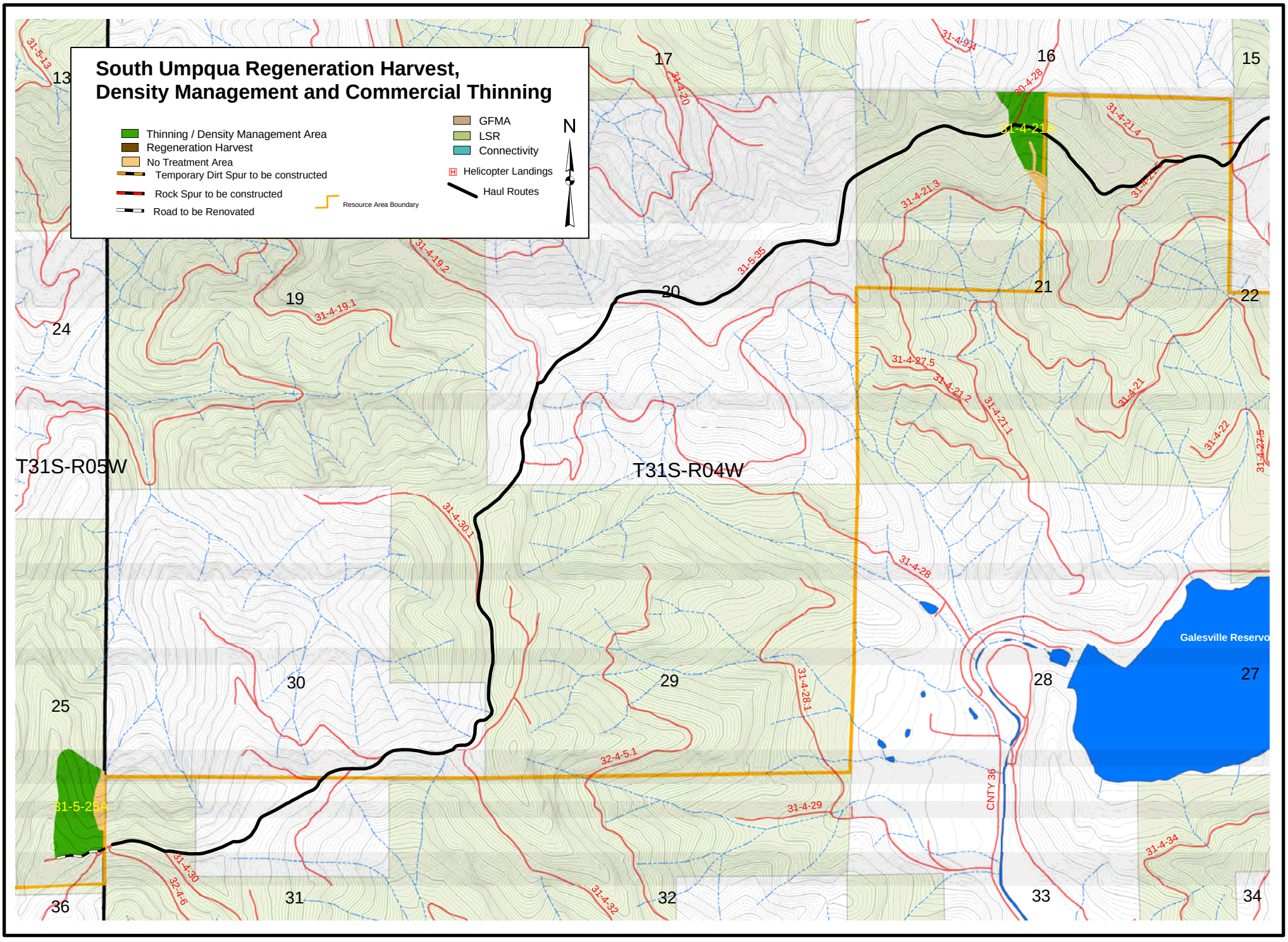
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Appendix B

Wildlife

Table B – 1 Special status wildlife species eliminated from further consideration

Status	Common Name	Scientific Name	Habitat Features Used	Reason Eliminated
Federal Threatened	Marbled Murrelet	*Brachyramphus marmoratus*		Out of species' range
Bureau Sensitive	American Peregrine Falcon	*Falco peregrinus*	Cliffs or other sheer vertical structure, generally in open habitat near water (White et al. 2002)	No Habitat
Bureau Sensitive	Columbian White-Tailed Deer	*Odocoileus virginianus leucurus*	Oak woodland	No Habitat
Bureau Sensitive (Suspected)	Fisher	*Martes pennanti*	Large contiguous blocks of mature forest with structural complexity (Verts and Carraway 1998)	No Habitat
Bureau Sensitive	Foothill Yellow-Legged Frog	*Rana boylii*	Low-gradient streams with bedrock or gravel substrate (Corkran and Thoms 1996)	Protected by Riparian Reserves if present
Bureau Sensitive	Lewis' Woodpecker	*Melanerpes lewis*	Open woodlands with ground cover and snags (Tobalske 1997)	No Habitat
Bureau Sensitive	Northwestern Pond Turtle	*Actinemys marmorata marmorata*	Marshes, ponds, lakes, streams, and rivers with emergent structure (Csuti et al. 1997).	No Habitat
Bureau Sensitive	Oregon Vesper Sparrow	*Pooecetes gramineus affinis*	Grassland, farmland, sage. Dry, open habitat with moderate herb and shrub cover (Jones and Cornely 2002)	No Habitat
Bureau Sensitive	Rotund Lanx	*Lanx subrotunda*	Umpqua River and major tributaries (USDA/USDI 1994)	No Habitat
Bureau Sensitive (Suspected)	Scott's Apatanian Caddisfly	*Allomyia scotti*	Low-gradient streams with gravel and cobble substrates (Wiggins 1977)	Protected by Riparian Reserves if present
Bureau Sensitive (Suspected)	Spotted Tail-Dropper	*Prophysaon vanattae pardalis*	Moist mature forest (Frest and Johannes 2000)	Out of species' range
Bureau Sensitive	Western Ridged Mussel	*Gonidea angulata*	Low to mid-elevation streams with cobble, gravel, or mud substrates (Nedeau et al.	Protected by Riparian Reserves if present
Bureau Sensitive	White-Tailed Kite	*Elanus leucurus*	Low-elevation grassland, farmland or savannah and nearby riparian areas (Dunk 1995)	No Habitat

Table B – 2 South Umpqua 2008 NSO site status, 2003-2007.

Site	IDNO	2007	2006	2005	2004	2003
MILLER MINES	0283	Pair	Pair	Pair	2 Fledged	Pair
TATER HILL	0295	Floater	Single+	Pair	2 Fledged	1 Fledged
SHIVELY FORKS	0297	Pair	2 Fledged	Pair	1 Fledged	Pair
OSHEA CREEK	0298	Pair	Single+	1 Fledged	Pair	1 Fledged
SWEAT CREEK	0364	Pair	Single+	Floater	Single+	Pair
TURKEY CREEK	0366	Pair	Pair	Single+	1 Fledged	Pair
UMPCOW	0894	2 Fledged	Floater	Floater	Floater	Floater
ST JOHNS CREEK	1809	Floater	Single+	Single+	2 Fledged	Floater
DAYBREAK	1810	Single+	Single+	2 Fledged	Single+	Single+
COFFEE CREEK	1930	Single+	Floater	Single+	Pair	Single+
HYDE RIDGE	1932	Single	Unoccupied	Unoccupied	Floater	Unoccupied
OSHEA CORNERS	1933	Unoccupied	Floater	Unoccupied	Unoccupied	Unoccupied
COFFEE FORKS	1994	Unoccupied	Unoccupied	Unoccupied	Floater	Floater
CORN CREEK NORTH	1995	Pair	Floater	Single+	1 Fledged	Pair
GRANITE CREEK	1996	Unoccupied	Unoccupied	Floater	Unoccupied	Single+
AZALEA PEAK	2073	Single+	Pair	2 Fledged	Single	Single+
STINGER GULCH	2091	Pair	Pair	1 Fledged	Pair	Pair
UPPER MAYS CREEK	2197	Single	Single+	1 Fledged	Pair	2 Fledged
RONDEAU BUTTE	2203	Unoccupied	Unoccupied	Unoccupied	Unoccupied	Pair
UPPER DAYS CREEK	2293	Unoccupied	Unoccupied	Floater	Single	Single
BEAR PAW	3104	Single+	Pair	Floater	Pair	Single
GRATEFUL DEAD	4046	Pair	Pair	Floater	3 Fledged	Pair
DECAF	4363	1 Fledged	Pair	1 Fledged	2 Fledged	1 Fledged
LOWER DAYS	4366	Unoccupied	Pair	Pair	Pair	Floater
SLIMER	4368	Floater	Floater	Pair	Pair	Floater
ASH CREEK	4538	Single+	Single	Pair	1 Fledged	Pair
MEL KAT	4576	Pair	Pair	Floater	Unoccupied	Unoccupied

Floater: A non-territorial spotted owl
Single: A territorial spotted owl that is unpaired
Single+: A ‘single’ spotted owl and a ‘floater,’ no apparent pair bond
Pair: Two territorial spotted owls that have formed a pair bond

Figure B-1 Spotted owl sites and proposed units

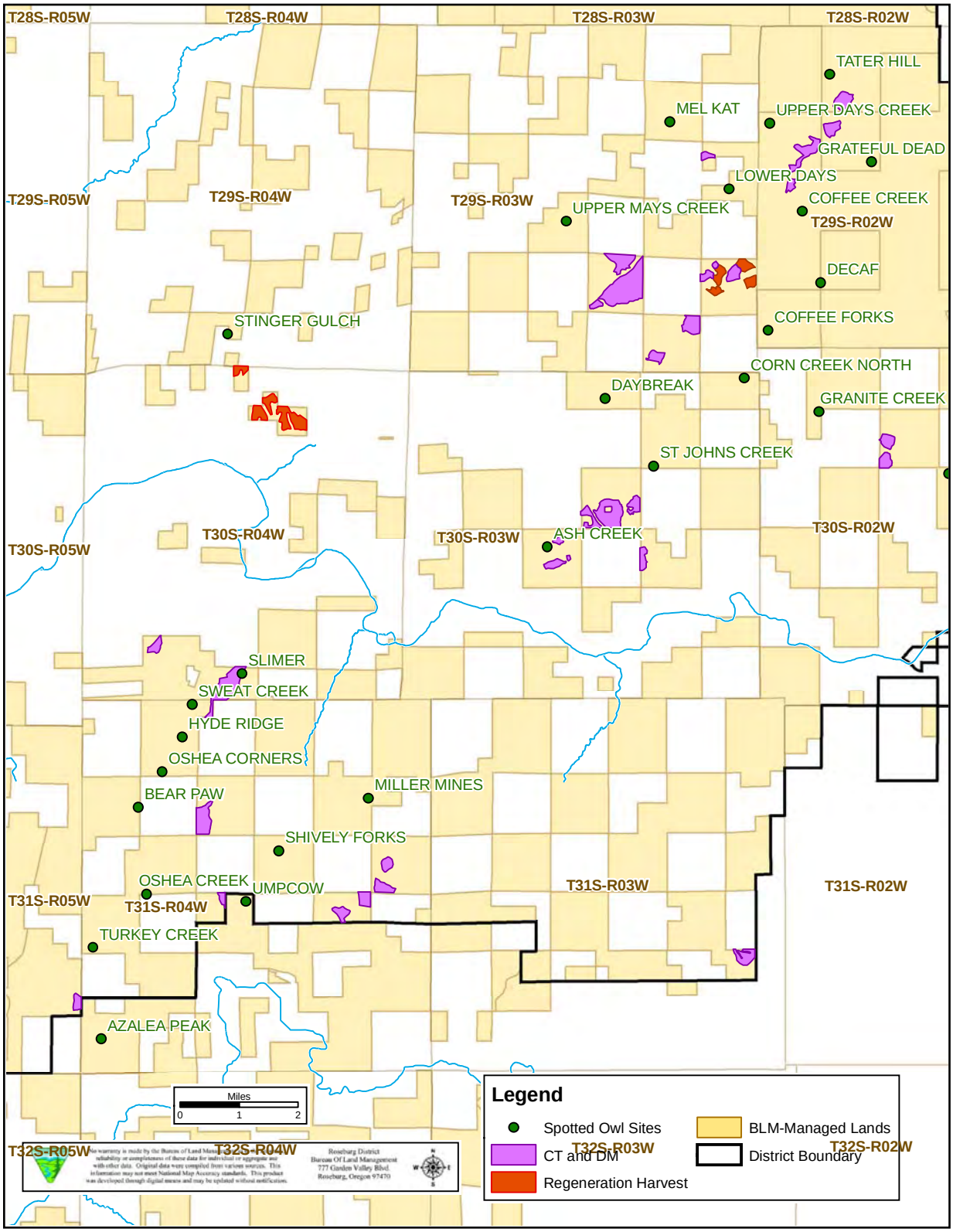


Figure B-2 Spotted owl Critical Habitat Units and Known Owl Activity Center P1994

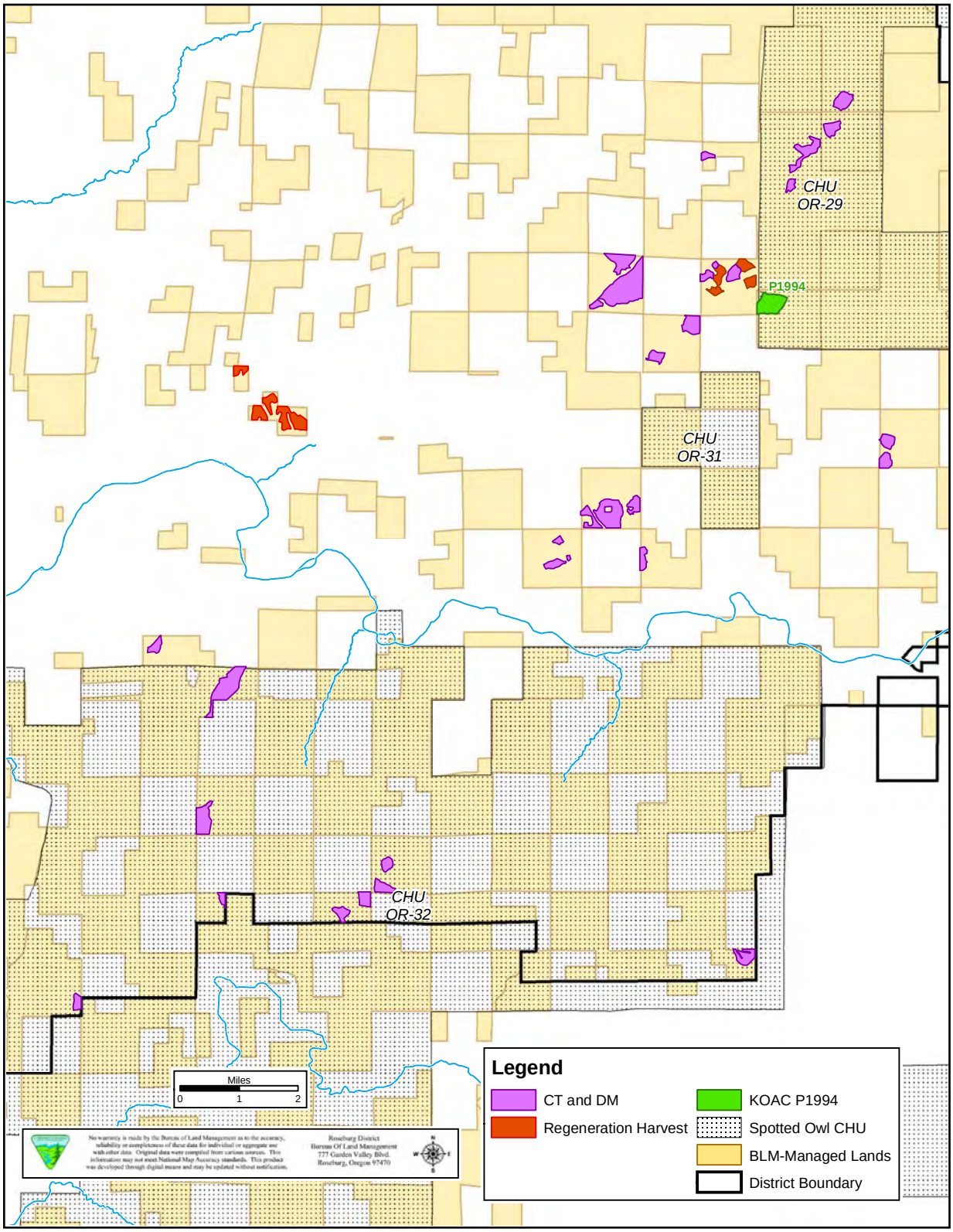


Figure B-3. Spotted Owl home ranges and habitat types, south area.

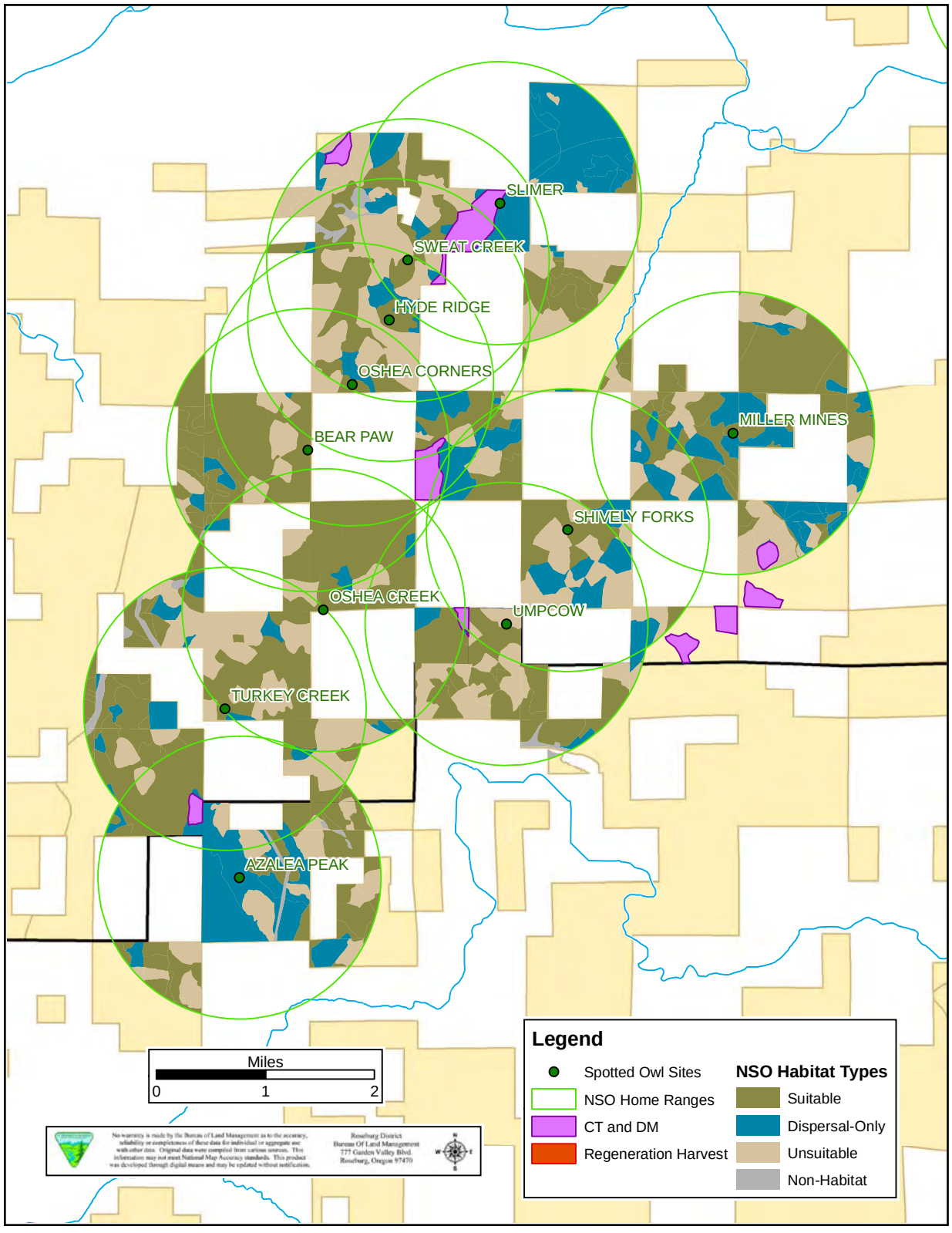
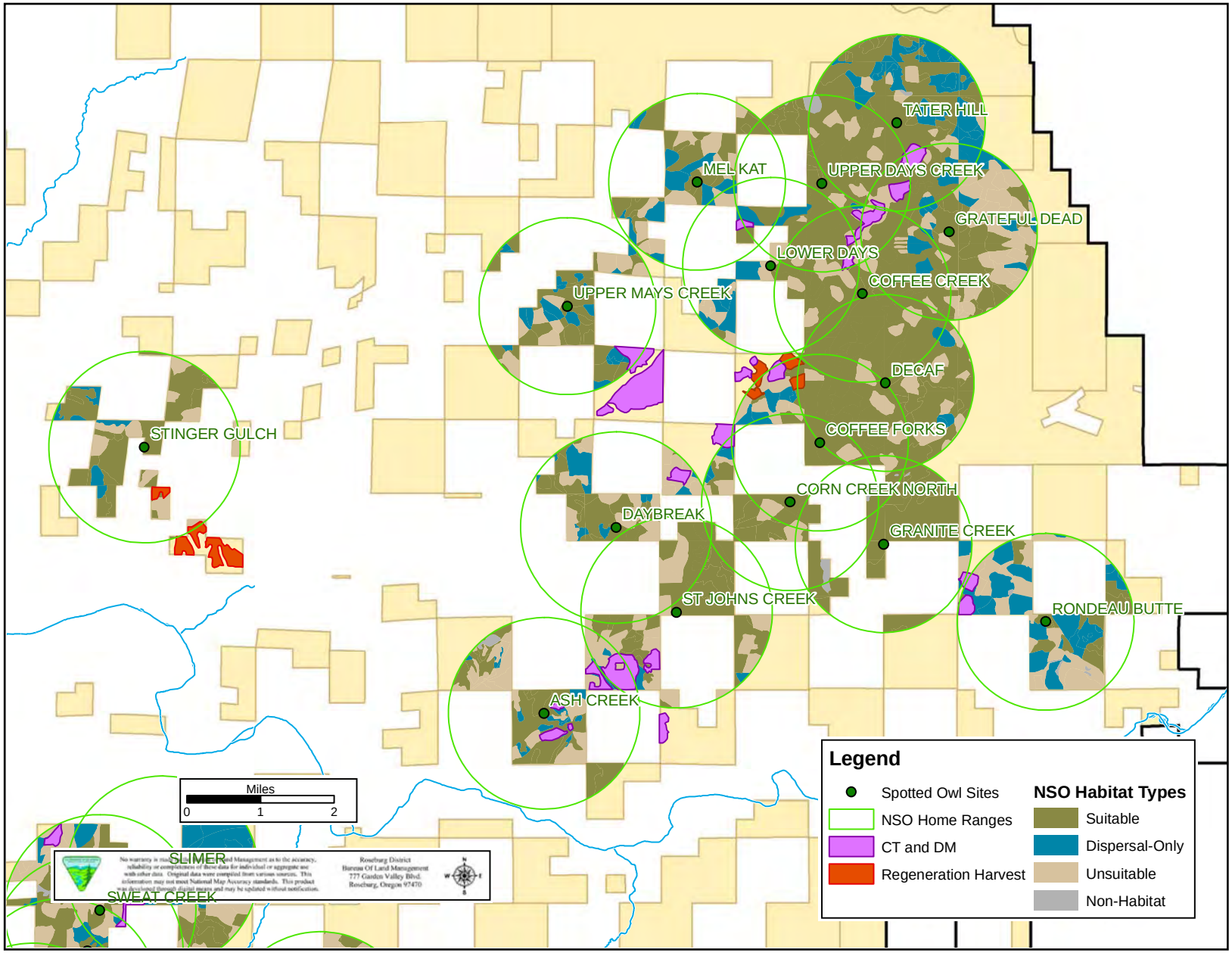


Figure B-4. Spotted Owl home ranges and habitat types, north area.



Evaluation of the Roseburg District Resource Management Plan Relative to Four Northern Spotted Owl Reports

File Code 1730/6840A

Evaluation of the Roseburg District Resource Management Plan Relative to Four Northern Spotted Owl Reports

September 12, 2005

I. Introduction

The Roseburg District Record of Decision (ROD) and Resource Management Plan (RMP), June 1995, incorporates and adopts the Northwest Forest Plan ROD (April 1994) based on the Interagency (BLM and Forest Service) Final Supplemental Environmental Impact Statement (February 1994) and the Roseburg District Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/EIS)(October 1994).

The overall objectives of the Northwest Forest Plan (NFP) and the Roseburg District RMP/ROD are to manage for healthy forest ecosystems with habitat that will support populations of native species, particularly those associated with late-successional habitat, and respond to the need for a sustainable supply of timber and other forest products. In addition, these plans are based on the principles of adaptive management. Adaptive management is a continuing process of monitoring, research, evaluation and adjusting, as determined necessary, with the objectives of improving the implementation and achieving the goals of the RMP/ROD. Under the concepts of adaptive management new information is evaluated and a decision is made to determine if adjustments or changes are deemed necessary (Roseburg RMP/ROD, June 1995).

The Bureau of Land Management (BLM), Forest Service (FS), and US Fish and Wildlife Service (USFWS) have conducted a coordinated review of four recently completed reports containing information on the NSO. The reviewed reports (hereinafter collectively referred to as "the reports") include the following:

- *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney et al. 2004);
- *Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony et al. 2004);
- *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and
- *Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005).

The interagency review and summary of the findings from those reports is described below.

The BLM planning regulations require that , "The District Manager shall be responsible for monitoring and evaluating the plan at "established intervals . . . and at other times as appropriate to determine whether there is sufficient cause to warrant amendment or revision of the plan" (see 43 CFR 1610.4-9).

As a key element of the Northwest Forest Plan monitoring strategy, completion of the NSO status and trend portion of *The First Ten Years* monitoring report, as well as the other timely studies pertinent to the NSO, is considered appropriate to warrant this focused evaluation. The monitoring report and this evaluation carry out the process of monitoring (ROD/RMP pp. 84-86 and adaptive management (ROD/RMP pp. 79-80) envisioned by the Northwest Forest Plan (NWFP), as adopted and implemented through the Roseburg District RMP.

Following is the interagency review and summary of key findings from the four reports regarding the NSO. This summary has been reviewed by report authors Dr. Steven P. Courtney and Dr. Robert G. Anthony to ensure that it accurately reflects their findings. In addition, agency representatives Terry Rabot and Joseph Lint reviewed the document to verify that the USFWS five-year review and the ten-year NSO status and trend report, respectively, were appropriately incorporated.

II. Review and Summary of Key Findings Regarding the Northern Spotted Owl

The most important conservation concerns addressed in the reports are: 1) the precipitous NSO population declines in Washington, and declining trends in the three northern Oregon demographic areas, as described by Anthony et al. (2004); and 2) the three major current threats identified by Courtney et al. (2004), i.e., lag effects from prior harvest of suitable habitat, habitat loss due to wildfire in portions of the range, and competition from barred owls.

Anthony et al. (2004) indicated that NSO populations were doing poorest in Washington, with precipitous declines on all four study areas. The number of populations that declined, and the rate at which they declined, were noteworthy (Anthony et al. 2004). In northern Oregon, NSO population declines were noted in all three study areas. The declines in northern Oregon were less than those in Washington, except in the Warm Springs study area, where the decline was comparable to those in Washington (Anthony et al. 2004). The NSO has continued to decline in the northern portion of its range, despite the presence of a high proportion of protected habitat on federal lands in that area. Although Courtney et al. (2004) indicated that population declines of the NSO over the past 14 years were expected, they concluded that the accelerating downward trends on some study areas in Washington where little timber harvest was taking place suggest that something other than timber harvest is responsible for the decline. Anthony et al. (2004) stated that determining the cause of this decline was beyond the scope of their study, and that they could only speculate among the numerous possibilities, including competition from barred owls, loss of habitat from wildfire, timber harvest including lag effects from prior harvest, poor weather conditions, and defoliation from insect infestations. Considering the fact that the NSO is a predator species, Anthony et al. (2004) also noted the complexities of relationships of prey abundance on predator populations, and identified declines in prey abundance as another possible reason for declines in apparent survival of NSO.

In southern Oregon and northern California, NSO populations were more stationary than in Washington (Anthony et al. 2004). The fact that NSO populations in some portions of the range were stationary was not expected within the first ten years, given the general prediction of continued declines in the population over the first several decades of NWFP implementation (Lint 2005). The cause of the better demographic performance on the southern Oregon and

northern California study areas, and the cause of greater than expected declines on the Washington study areas are both unknown (Anthony et al. 2004). Courtney et al. (2004) noted that a rangewide population decline was not unexpected during the first decade, nor was it a reason to doubt the effectiveness of the core NWFP conservation strategy.

Lint (2005) indicated that loss of NSO habitat did not exceed the rate expected under the NWFP, and that habitat conditions are no worse, and perhaps better than expected. In particular, the percent of existing NSO habitat removed by harvest during the first decade was less than expected. Courtney et al. (2004) indicated that models of habitat growth suggest that there is significant ingrowth and development of habitat throughout the federal landscape. Courtney et al. (2004) also noted that management of matrix habitat has had a lower impact on NSO populations than predicted. Owls are breeding in substantial numbers in some matrix areas. The riparian reserve strategy and other habitat management guidelines for the matrix area appear to preserve more, better, and better-distributed dispersal habitat than earlier strategies, and there is no evidence to suggest that dispersal habitat is currently limiting to the species in general (Courtney et al. 2004). Anthony et al. (2004) noted declining NSO populations on some study areas with little harvest, and stationary populations on other areas with consistent harvest of mature forest. No simple correlation was found between population declines and timber harvest patterns (Courtney et al. 2004). Because it was not clear if additional protection of NSO habitat would reverse the population trends, and because the results of their study did not identify the causes of those trends, Anthony et al. (2004) declined to make any recommendations to alter the current NWFP management strategy.

Reductions of NSO habitat on federal lands are lower than those originally anticipated by the Service and the NWFP (Courtney et al. 2004). The threat posed by current and ongoing timber harvest on federal lands has been greatly reduced since 1990, primarily because of the NWFP (Courtney et al. 2004). The effects of past habitat loss due to timber harvest may persist due to time-lag effects. Although noting that it is probably having a reduced effect now as compared to 1990, Courtney et al. (2004) identified past habitat loss due to timber harvest as a current threat. The primary current source of habitat loss is catastrophic wildfire (Courtney et al. 2004). Although the total amount of habitat affected by wildfires has been small, there is concern for potential losses associated with uncharacteristic wildfire in a portion of the species range. Lint (2005) indicated that the NWFP recognized wildfire as an inherent part of managing NSO habitat in certain portions of the range. Courtney et al. (2004) stated that the risk to NSO habitat due to uncharacteristic stand replacement fires is sub-regional, confined to the dry eastern and to a lesser extent the southern fringes of the NSO range. Wildfires accounted for 75 percent of the natural disturbance loss of habitat estimated for the first decade of NWFP implementation (Courtney et al. 2004). Lint (2005) cautioned against relying solely on the repetitive design of the conservation strategy to mitigate effects of catastrophic wildfire events, and highlighted the potential to influence fire and fire effects through active management.

Anthony et al. (2004) indicated that there is some evidence that barred owls may have had a negative effect on NSO survival in the northern portion of the NSO range. They found little evidence for such effects in Oregon or California. The threat from barred owl competition has not yet been studied to determine whether it is a cause or a symptom of NSO population declines, and the reports indicate a need to examine threats from barred owl competition.

The synergistic effects of past threats and new threats are unknown. Though the science behind the NWFP appears valid, new threats from barred owls, and potential threats[1] from West Nile virus and Sudden Oak Death may result in NSO populations in reserves falling to lower levels (and at a faster rate) than originally anticipated. If they occur, such declines could affect NSO recovery (Courtney et al. 2004). According to Courtney et al. (2004), there exists a potential for habitat loss due to Sudden Oak Death in the southern portion of the range, however the threat is of uncertain proportions. In addition, Courtney et al. (2004) indicated there is no way to predict the impact of West Nile virus, which is also identified as a potential threat. The reports do not provide supporting analysis or recommendations regarding how to deal with these potential threats. Courtney et al. (2004) concluded that the risks currently faced by the NSO are significant, and their qualitative evaluation is that the risks are comparable in magnitude to those faced by the species in 1990.

According to the USFWS (November 2004), the current scientific information, including information showing declines in Washington, northern Oregon, and Canada, indicates that the NSO continues to meet the definition of a threatened species. Populations are still relatively numerous over most of the species' historic range, which suggests that the threat of extinction is not imminent, and that the subspecies is not endangered even in the northern part of its range where greater than expected population declines were documented (USFWS, November 2004). The USFWS (November 2004) did not consider the increased risk to NSO populations due to the uncertainties surrounding barred owls and other factors sufficient to reclassify the species to endangered at this time.

In summary, although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with barred owls, and habitat loss due to wildfire were identified as current threats; West Nile virus and Sudden Oak Death were identified as potential new threats. Complex interactions are likely among the various factors. The status of the NSO population, and increased risk to NSO populations due to uncertainties surrounding barred owls and other factors, were reported as not sufficient to reclassify the species to endangered at this time. The reports did not include recommendations regarding potential changes to the basic conservation strategy underlying the NWFP, however they did identify opportunities for further study.

The full reports are accessible on the internet at the following addresses:

- Courtney et al. 2004: http://www.sei.org/owl/finalreport/finalreport.htm
- Anthony et al. 2004: http://www.reo.gov/monitoring/trends/Compiled%20Report%20091404.pdf

[1] Courtney et al. (2004) distinguish between operational threats (perceived as currently negatively influencing the status of the NSO) and potential threats (factors that could become operational threats in 15-20 years, or factors that may be threatening the NSO currently and for which the extent of the threat is uncertain).

- USFWS, November 2004: http://www.fws.gov/pacific/ecoservices/endangered/recovery/5yearcomplete.html
- Lint, Technical Coordinator, 2005: http://www.reo.gov/monitoring/10yr-report/northern-spotted-owl/documents/owl_text%20and%20tables.pdf

III. Comparative Evaluation of the Roseburg District Resource Management Plan with the Four, Previously Referenced, Reports on the Northern Spotted Owl.

Following are excerpts from the Roseburg District RMP, the supporting Roseburg District Proposed Resource Management Plan/Environmental Impact Statement (PRMP/EIS) and the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (FSEIS). These excerpts form the basis for short discussions of consistency of the report findings with effects described for the NSO in the PRMP/EIS and FSEIS, and the ability to meet RMP goals and objectives.

The Roseburg District PRMP/EIS summarizes discussions from the FSEIS regarding NSO populations. "The overall results [declining populations across much of their range] of the demographic analysis were not surprising since the data was gathered during a time of habitat decline that was of sufficient concern to serve as the primary reason for listing of the owl as a threatened species" and "the result that should be of most concern is the declining rate of adult survival". "While there is strong reason to believe that the owl populations have declined across much of their range there is ample reason to believe that the pattern of population change is not the same everywhere" and "It is unlikely that a single factor, with the exception of habitat loss, is primarily responsible for the declines in owl populations across its range" (PRMP/EIS pp. 4-63 – 4-64). Also as stated in the FSEIS under the strategies proposed, both the Interagency Scientific Committee (Thomas et al 1990) and the Northern Spotted Owl Recovery Team (USDI 1992) projected that owl habitat and owls would continue to decline for up to 50 years before reaching a new equilibrium.

The continuing decline in NSO populations was anticipated and is consistent with the analysis in the Roseburg PRMP/EIS and Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (FSEIS) (USDA; USDI, 1994a). The Roseburg PRMP/EIS incorporated by reference (PRMP/EIS 4-54, 4-63) the discussion and conclusions of the FSEIS relating to the analysis of the spotted owl population trends (FSEIS Chapter 3&4, pages 3&4-212 to 245 and Appendix J3). The discussion and conclusions in the FSEIS and the Roseburg PRMP/EIS anticipate that NSO populations had declined throughout much of their range and would continue to decline for the first few decades of the NFP implementation. It also concluded that the effects or rate of decline from implementation would not be the same everywhere across the range and for all habitat types. These conclusions are consistent with the information in Section II of this evaluation in that the reports did not find a direct correlation between habitat conditions and changes in NSO populations and were also inconclusive as to the cause of the population declines.

Lint (2005) indicated that the NWFP recognized wildfire as an inherent part of managing NSO habitat in certain portions of the range. Courtney et al. (2001) also added "The Forest Plan acknowledges the potential for the loss of owls and habitat from catastrophic events such as wildfire, particularly in the East Cascade Provinces and the Klamath Province." (pp 6_25) Even though stand replacing wildfire is identified as a continuing threat to NSO suitable habitat in the reports, it is not considered a widespread threat throughout the range of the NSO. Stand replacing wildfire did have some local negative effects, but these were most notable in the Klamath Provinces in northern California and southern Oregon.

The threat from barred owls competition was not considered specifically in the Roseburg PRMP/EIS or the FSEIS although it did consider other factors outside of habitat loss. It was a concern that other factors may be responsible for population decline outside of those that could be managed under land management practices. "... it is unlikely that a single factor, with the exception of habitat loss, is primarily responsible for the declines in [Northern spotted] owl populations across the range" (PRMP/EIS 4-64). Anthony et al indicated that there is some evidence that barred owls may have had a negative effect on NSO survival in the northern portion of the range. They have found little evidence for such effects in Oregon and California. The threat from barred owl competition has not yet been studied to determine whether it is a cause or a symptom of NSO declines, and the reports indicate a need to examine these threats from barred owl competition.

IV. Conclusions/Findings

Based on the above evaluation of pertinent elements of the Roseburg District ROD/RMP and its associated PRMP/EIS, I find that effects on NSO populations identified in the four reports are within those anticipated in the PRMP/EIS, and that the RMP goals and objectives are still achievable in light of the information from the reports As such, I find that the latest information on the NSO does not warrant a change in RMP decisions pertinent to the NSO, and therefore does not warrant amendment or revision of the Roseburg District RMP. I also find that the underlying analysis in the EIS remains adequate for purposes of tiering NEPA analyses of NSO effects from proposed actions implementing the RMP.

Jay K. Carlson
District Manager, Roseburg District

9/14/05
Date

References

USDA; USDI, 1994a. U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management, February 1994. Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.

USDA; USDI, 1994b. U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management, April 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl.

Appendix C
Botany

BLM Special Status Species

Scientific Name	Taxon	Status	Habitat Present	Survey Done
Plagiobothrys hirtus	Vascular Plant	Federal Endangered	No	N/A
Adiantum jordanii	Vascular Plant	Bureau Sensitive	Yes	No
Arabis koehleri var. *koehleri*	Vascular Plant	Bureau Sensitive	No	N/A
Asplenium septentrionale	Vascular Plant	Bureau Sensitive	Yes	No
Botrychium minganense	Vascular Plant	Bureau Sensitive	No	N/A
Calochortus coxii	Vascular Plant	Bureau Sensitive	No	N/A
Calochortus umpquaensis	Vascular Plant	Bureau Sensitive	No	N/A
Carex brevicaulis	Vascular plant	Bureau Sensitive	Yes	No
Carex comosa	Vascular Plant	Bureau Sensitive	Yes	No
Carex gynodynama	Vascular Plant	Bureau Sensitive	Yes	No
Carex serratodens	Vascular Plant	Bureau Sensitive	Yes	No
Cicendia quadrangularis	Vascular Plant	Bureau Sensitive	No	N/A
Cypripedium fasciculatum	Vascular Plant	Bureau Sensitive	Yes	No
Delphinum nudicaule	Vascular Plant	Bureau Sensitive	Yes	No
Epilobium oreganum	Vascular Plant	Bureau Sensitve	Yes	No
Eschscholzia caespitosa	Vascular Plant	Bureau Sensitive	Yes	No
Horkelia congesta ssp. *congesta*	Vascular Plant	Bureau Sensitive	Yes	No
Horkelia tridentata ssp. Tridentata	Vascular plant	Bureau Sensitive	Yes	No
Iliamna latibracteata	Vascular Plant	Bureau Sensitive	Yes	No
Kalmiopsis fragans	Vascular Plant	Bureau Sensitive	No	N/A
Lathyrus holochlorus	Vascular plant	Bureau Sensitive	Yes	No
Lewisia Leana	Vascular Plant	Bureau Sensitive	Yes	No
Limnanthes gracilis var. *gracilis*	Vascular Plant	Bureau Sensitive	Yes	No
Lotus stipularis	Vascular Plant	Bureau Sensitive	Yes	No
Meconella oregana	Vascular Plant	Bureau Sensitive	Yes	No
Pellaea andromedaefolia	Vascular Plant	Bureau Sensitive	Yes	No
Perideridia erythrorhiza	Vascular Plant	Bureau Sensitive	Yes	No
Polystichum californicum	Vascular Plant	Bureau Sensitive	Yes	No

Scientific Name	Taxon	Status	Habitat Present	Survey Done
Romanzoffia thompsonii	Vascular Plant	Bureau Sensitive	Yes	No
Schoenopectus subterminalis	Vascular Plant	Bureau Sensitive	Yes	No
Scirpus pendulus	Vascular Plant	Bureau Sensitive	Yes	No
Sisyrinchium hitchcockii	Vascular Plant	Bureau Sensitive	No	N/A
Utricularia gibba	Vascular Plant	Bureau Sensitive	No	N/A
Utricularia minor	Vascular Plant	Bureau Sensitive	No	N/A
Wolffia borealis	Vascular Plant	Bureau Sensitive	No	N/A
Wolffia columbiana	Vascular Plant	Bureau Sensitive	No	N/A
Chiloscyphus gemmiparus	Bryophyte	Bureau Sensitive	No	N/A
Diplophyllum plicatum	Bryophyte	Bureau Sensitive	Yes	No
Entosthodon fascicularis	Bryophyte	Bureau Sensitive	Yes	No
Gymnomitrion concinnatum	Bryophyte	Bureau Sensitive	Yes	No
Helodium blandowii	Bryophyte	Bureau Sensitive	Yes	No
Meesia uliginosa	Bryophyte	Bureau Sensitive	Yes	No
Schistostega pennata	Bryophyte	Bureau Sensitive	Yes	No
Tayloria serrata	Bryophyte	Bureau Sensitive	Yes	No
Tetraphis geniculata	Bryophyte	Bureau Sensitive	Yes	No
Tetraplodon mnioides	Bryophyte	Bureau Sensitive	Yes	No
Tomentypnum nitens	Bryophyte	Bureau Sensitive	Yes	No
Tortula mucronifolia	Bryophyte	Bureau Sensitive	Yes	No
Trematodon boasii	Bryophyte	Bureau Sensitive	Yes	No
Bryoria subcana	Lichen	Bureau Sensitive	No	N/A
Calicium adspersum	Lichen	Bureau Sensitive	No	N/A
Chaenotheca subroscida	Lichen	Bureau Sensitive	Yes	No
Dermatocarpon meiophyllizum	Lichen	Bureau Sensitive	Yes	No
Hypogymnia duplicata	Lichen	Bureau Sensitive	Yes	No
Leptogium cyanescens	Lichens	Bureau Sensitive	Yes	No
Lobaria linita	Lichen	Bureau Sensitive	Yes	No
Pannaria rubiginosa	Lichen	Bureau Sensitive	Yes	No

Scientific Name	Taxon	Status	Habitat Present	Survey Done
Pilophorus nigricaulis	Lichen	Bureau Sensitive	No	N/A
Bridgeoporus nobilissimus	Fungi	Bureau Sensitive	No	N/A
Cudonia monticola	Fungi	Bureau Sensitive	Yes	Not practical
Dermocybe humboldtensis	Fungi	Bureau Sensitive	Yes	Not practical
Gomphus kauffmanii	Fungi	Bureau Sensitive	Yes	Not practical
Helvella crassitunicata	Fungi	Bureau Sensitive	Yes	Not practical
Leucogaster citrinus	Fungi	Bureau Sensitive	Yes	Not practical
Otidea smithii	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia californica	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia dissiliens	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia gregaria	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia olivacea	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia oregonensis	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia pseudofestiva	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia scatesiae	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia sipei	Fungi	Bureau Sensitive	Yes	Not practical
Phaeocollybia spadicea	Fungi	Bureau Sensitive	Yes	Not practical
Pseudorhizina californica	Fungi	Bureau Sensitive	Yes	Not practical
Ramaria amyloidea	Fungi	Bureau Sensitive	Yes	Not practical
Ramaria gelatiniaurantia	Fungi	Bureau Sensitive	Yes	Not practical
Ramaria spinulosa var. diminutiva	Fungi	Bureau Sensitive	Yes	Not practical
Rhizopogon chamalelontinus	Fungi	Bureau Sensitive	Yes	Not practical
Rhizopogon exiguus	Fungi	Bureau Sensitive	Yes	Not practical
Sowerbyella rhenana	Fungi	Bureau Sensitive	Yes	Not practical

Appendix D

Consistency of the Proposed Action with the Aquatic Conservation Strategy

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on **public lands**. The ACS must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats. This approach seeks to prevent further degradation and restore habitat over broad landscapes as opposed to individual projects or small watersheds. (Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, page B-9).

ACS Components:

Key Watersheds: The proposed South Umpqua River Watershed Harvest Plan, excepting a few acres that overlap ridge top locations in the Middle Cow and Upper Cow fifth-field watersheds, is principally located within the South Umpqua River fifth-field watershed on lands that are designated as Tier 1 Key watershed.

Management direction pertinent to resource management activities in Key Watersheds specifies that: watershed analysis be completed, reduce existing road mileage, and give highest priority to watershed restoration.

As described on page one of this environmental assessment, information and recommendations from the South Umpqua Watershed Analysis and Water Quality Restoration Plan were considered in the development of the proposed action.

As discussed on page 17 of this environmental assessment, the BLM has reduced permanent road mileage on BLM-managed lands in the South Umpqua River fifth-field watershed by 4.8 miles since implementation of the ROD/RMP and has identified 2.27 miles of road as candidates for decommissioning, pursuant to the agreement of other parties holding access rights across these roads.

With respect to restoration actions in the watershed, the BLM has:

- Decommissioned roads as described above;
- Conducted density management in Riparian Reserves and Late-Successional Reserves in the Bland Days Commercial Thinning, Wasted Days Commercial Thinning, Bigfoot Density Management, Slimewater Density Management and Lively Shively Density Management projects;
- Replaced stream crossings that were barriers to fish passage on streams that include Days Creek, Fate Creek, East Fork Stouts Creek, St. John Creek, Beals Creek and W. Fork Canyon Creek;
- Conducted in-stream placement of large wood on an unnamed tributary to W. Fork Canyon Creek, Days Creek, Shively Creek and Stouts Creek; and
- Partnered with other Federal, State and County agencies, and individuals to implement a variety of fish passage and instream projects on Fate Creek, Shively Creek and Stouts Creek under Title II authority of the Secure Rural Schools and Community Self-Determination Act.

Riparian Reserves: This project is designed to restore species and structural diversity and accelerate development of late-seral forest characteristics in Riparian Reserves in the Matrix allocations and in riparian forest areas in the Late-Successional Reserves.

Watershed Restoration: Two of the primary objectives of this project are to accelerate tree growth in Riparian Reserves, and speed the development and attainment of late-seral habitat conditions in Late-Successional Reserves. Consequently, the proposed action is considered to be a watershed restoration project. *Watershed Restoration* is the only ACS component that is an action, while the others are location-based or process-based.

Watershed Analysis (and Other Information): In development of the proposed commercial thinning and density management project, the South Umpqua Watershed Analysis and Water Quality Restoration Plan, Aquatic Habitat Surveys conducted by the Oregon department of Fish and Wildlife, and the *South Umpqua River/Galesville Late-Successional Reserve Assessment* were used to evaluate existing conditions, establish desired future conditions, and assist in the formulation of appropriate alternatives.

As described in this document (pp. 19-20), information from watershed analysis (WA, pp. 24, 29, 38, and 71-73) was used to describe the age class/seral class distribution of forest stands managed by the BLM and private entities, and the vegetative zones within the project area(WA, pp. 52-56). A description of Matrix stands (WA, p. 92) and LSR stands (WA, p. 96) potentially available for thinning and density management was also provided.

A description of existing aquatic habitat conditions across the watershed was derived from Aquatic Habitat Inventory by the Oregon Department of Fish and Wildlife, supplemented by site-specific evaluation as discussed in the EA (pp. 30-33). A description of watershed conditions, with respect to flows and water quality is contained in the Water Resources section of the EA (pp. 33-34).

The direct effects of the proposed action on fish, aquatic habitat and Essential Fish Habitat are addressed (pp. 61-66). The effects were judged to be non-existent, or negligible and discountable without potential for cumulative effects at the watershed scale.

The direct effects of the proposed action on stream flows and water quality are also addressed (pp. 65-68). No measurable or detectable increases in peak flows are anticipated. Commercial thinning and density management would not affect stream temperature. Effects to sediment would be localized. The effects were judged to be non-existent, or negligible and discountable without potential for cumulative effects at the watershed scale. There would be no effects to the timing and quantity of flow delivery.

Individual ACS Objective Assessment

ACS Objective	Site/Project Scale Assessment	5th Field Watershed Scale Assessment
	Scale Description: The proposed projects are located in the Days Creek, Coffee Creek, St. Johns Creek, Shively-O'Shea Creek and Stouts Creek sixth-field subwatersheds, encompassing roughly 47,000 acres. The BLM manages approximately 39 percent of the forested acres in the two subwatersheds. Units proposed for treatment total 1,457 acres representing 1.3 percent of the total forested area, and 3.3 percent of the BLM-managed forest lands.	Scale Description: The project area is located in the South Umpqua River fifth-field watershed, which encompasses approximately 141,455 acres. The BLM manages approximately 58,000 acres or 41 percent of the watershed area. Units proposed for treatment represent approximately one percent of the total watershed area, and 2.5 percent of the BLM-managed lands.
1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.	For regeneration harvest, establishment of full Riparian Reserves one or two site-potential tree heights in width would maintain the native forest and vegetative communities astride streams. Commercial thinning and density management would aid in restoring these streamside communities by promoting canopy stratification, establishment of understory vegetative growth, and retention of hardwoods and less common conifers to diversify the stands.	The thinning and density management treatments would also speed attainment of this objective at the watershed scale.
2. Maintain and restore spatial and temporal connectivity within and between watersheds	Within the project subwatersheds, as described in the EA (p. 66), the proposed project would have no influence on aquatic connectivity because there would be no construction of any stream crossings with the potential to impede upstream and downstream movement of aquatic vertebrate and invertebrate species. Consequently, the proposed action would maintain the existing connectivity condition at the site scale.	Within the watershed, the proposed regeneration harvest, commercial thinning and density management would have no influence on aquatic connectivity. Therefore the proposed timber management plan would maintain the existing connectivity condition at the watershed scale.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations	The proposed regeneration harvest of 236 acres is not anticipated to affect peak flows (EA, p. 66) because of the small area in the Transient Snow Zone that would be affected at the watershed scale, nor have an effect on low flows and annual water yield (EA, p. 67). Thinning treatments would not reduce canopy closure to an extent that would influence water yields and in-stream flows, because the remaining trees generally use any increased soil moisture that becomes available following timber harvest (EA, p. 68). Riparian Reserves and "no-harvest" buffers would also provide for stream bank stability and prevent disturbance to stream banks and channels thus maintaining the physical integrity of the aquatic system at the site scale. (EA, p. 63)	The proposed timber management plan would also maintain the physical integrity of aquatic systems at the watershed scale.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland	Project design criteria would ensure that water quality would not be adversely impacted by the proposed action. As discussed in the EA (p. 63), Riparian Reserves would be established on all	Based on the information discussed at the site scale, water quality would also be maintained at the watershed scale.

ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.	intermittent and perennial streams. On regeneration harvest units, no timber harvest or operations would be allowed within the Riparian Reserves. In commercial thinning and density management units, variable width "no-harvest" buffers established along streams would retain shading and hence maintain water temperature. As further described, "no-harvest" buffers would prevent disturbance to stream channels and stream banks, and intercept surface run-off allowing sediment transported by overland flow to precipitate out before reaching active waterways. Therefore, water quality would be maintained the existing water quality at the site scale.	
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved.	As described above, full Riparian Reserves in regeneration harvest units and "no-harvest" buffers immediately adjacent to streams in commercial thinning and density management units would prevent disturbance to stream channels and stream banks and intercept surface run-off allowing sediment transported by overland flow to precipitate out before reaching active waterways, thus maintaining the existing sediment regime.	This project would maintain the existing sediment regime at the watershed scale as well.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.	As described in #3 above, the proposed timber harvest would not have measurable and quantifiable effects on either peak flows, or low base flows.	As discussed at the site scale, the proposed timber management plan would also maintain stream flows within the range of natural variability.
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and woodlands.	As discussed in #6 above, this project would maintain stream flows within the range of natural variability at the site scale. Therefore, it would also maintain stream interactions with the floodplain and respective water tables at the site scale.	At the watershed scale, this project would also maintain stream interactions with the floodplain and respective water tables within the range of natural variability.
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.	Full Riparian Reserves on streams in or adjacent to regeneration harvest units would maintain the present native species composition and provide for normal riparian function. Another objective of the proposed action is application of thinning and density management of young, managed stands to return riparian forest, and in the added case of LSRs, upland stands to a more natural density and growth trajectory. Therefore this treatment would serve to restore plant species composition and structural diversity at the site scale.	The proposed treatment is designed to return riparian and upslope stands to a more natural density and growth trajectory. Therefore this treatment would serve to restore plant species composition and structural diversity at the larger watershed scale as well.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.	As mentioned previously, one of the objectives of the proposed action is to restore riparian stand conditions. Implementation of riparian restoration projects will help restore adequate habitat to support riparian-dependent species at the site scale.	The riparian restoration components of the proposed action would help restore adequate habitat to support riparian-dependent species at the watershed scales.

Summary: Based upon the information discussed above, the proposed action would meet Aquatic Conservation Strategy objectives at the site and watershed scale, and based upon the restorative nature of the action, this project would not retard or prevent attainment of ACS objectives. In many instances, it would actually speed attainment of these objectives. Therefore, this action is consistent with the Aquatic Conservation Strategy, and its objectives at the site and watershed scales.